Transportation
Objectives and Policies

Green Bay
Smart Growth 2022

5. **Entertainment Village:** Create a 'round-the-clock activity place that complements the Town Square Village by providing opportunities for business, leisure and community activities composed of:
   - A signature office complex at Walnut and Washington Streets
   - Fox Theatre renovation
   - Mixed-use commercial infill
   - Mixed-use parking ramp
   - Open-air market and marina at the existing bus garage
   - Cultural heritage center south of Mason Street on the river

6. **Broadway Village:** Provide opportunities for business ventures to operate in a distinctive environment and take advantage of opportunities provided by the character of the Broadway Corridor and the Fox River, including these elements:
   - Mixed-use infill and pedestrian-oriented development
   - Mixed-use infill automobile-oriented development
   - Fox River and Great Lakes Park north of Dousman Street
   - Neville Museum expansion
   - Marina and mixed-use complex north of Mason Street
   - Mixed-use redevelopment south of Walnut Street

7. **Convention Center District:** Create a highly identifiable and viable convention center complex that serves the intrastate and interregional conference and meeting markets, including:
   - Convention center expansion
   - East River Park extension
   - Convention marina
   - A landmark tower
   - Hotel expansion
   - A new hotel
   - A mixed-use parking ramp

8. **Fox River Redevelopment:** Continue to assist in the redevelopment of both banks of the Fox River. Emphasize the remediation of polluted sites or buildings, the relocation of activities that do not require or benefit from a riverfront location, and the introduction of land uses such as water-dependant industry, housing, offices, restaurants, hotels and marinas.

9. **Fox Riverwalk Parks and Trails:** Complete a system of pedestrian esplanades, plazas and walks on both sides of the river with links to the Downtown, the neighborhoods and the East River park system.

10. **Wayfinding and Gateways:** Create a system of wayfinding and gateways signs around the city and the Downtown to help people find their way to Downtown, experience a sense of arrival, find their way to key sites Downtown and build Downtown identity.

Transportation Plan

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Appendix A: Travel Demand Model and Forecasts

Transportation Plan

Relationship to the Issues and the Concept Plan

The purpose of the Green Bay Transportation Plan is to guide public policy in regard to the evolution of the overall transportation system, and specifically recommend objectives and actions that are consistent with the land use and urban design components of the *Smart Growth 2022* plan.

While private interests take the lead role in the development of land, most of the transportation system is in the public realm. Those portions of the system which the City of Green Bay is responsible for (including local streets, sidewalks, local trails, and public parking lots) are maintained and constructed by the City through its capital and operating budgets. The Transportation Plan outlines specific projects for the City to undertake in regard to new roads, reconfiguration of existing roads, and access management, while also providing strategies for addressing capacity issues and approaches to integrating the movement of people and goods with City goals addressing neighborhood revitalization and directing new growth.

Summary of Issues

The following questions provide a summary of the major transportation issues as identified in the *Analysis of Conditions and Identification of Issues*.

Roadway Network: Where should new major roadways and local streets be constructed to guide community growth? How can street design be improved to support neighborhood and downtown revitalization? What levels of service are acceptable and how can the values of transportation movement and community livability be successfully balanced?

Land Use: How can the provision of transportation infrastructure be coordinated within the overall structure of the existing land use pattern and with planned area of new development?

Transit: How can transit ridership be increased for all trips and how can commuter trips on public transit be increased from the current 1.5 percent?

Transportation Alternatives: Should the City implement policies that promote alternatives to driving alone?

Access Management: What levels of access management should be implemented and on what portion of the transportation system?

Sidewalk Requirements: Should sidewalks be required for all new development and retrofitted where applicable and how should such a requirement be funded?

Bicycle Facilities: Are more bicycle paths and trails needed to provide safe and direct connections between all areas of the city?

Parking: How should parking in the Central Business District (CBD) and in other commercial areas be managed? Should parking requirements in the zoning code be changed to allow for compact growth?

Passenger Rail: What should the City do in response to the Midwest Regional Rail Initiative?

Freight Rail: What steps should the City take to minimize conflicts between freight rail and automobiles? Do trains have impacts on neighborhoods that need to be mitigated?

Regional Airport: Does airport traffic effect neighborhood livability and how can impacts be mitigated? Will the airport require any new land in the future?

Waterways: What are the future needs of terminals along the Fox River in terms of intermodal facilities, railroad yards, truck routes, and land? How can the transportation plan support port facilities?

Guidance from the Concept Plan

The Concept Plan for *Smart Growth 2002* recommends that the City of Green Bay's transportation planning support the goals of neighborhood and downtown revitalization and compact growth through the following strategies:

Supportive Land Use Planning: The Land Use Plan should promote increased concentrations of jobs and housing in order to efficiently use existing transportation infrastructure and provide for the viability of alternative transportation modes.

Existing Streets: The City should focus public investment on improving the existing street network to enhance through movement and traffic dispersion, while minimizing negative transportation impacts to neighborhoods through traffic calming and streetscape enhancements. In addition, the City should work to minimize transportation impacts to the natural environment.

New Minor and Residential Streets: The width of new local (minor) residential streets should be decreased from current standards. New local residential streets should be fully interconnected and the number of cul-de-sacs minimized.

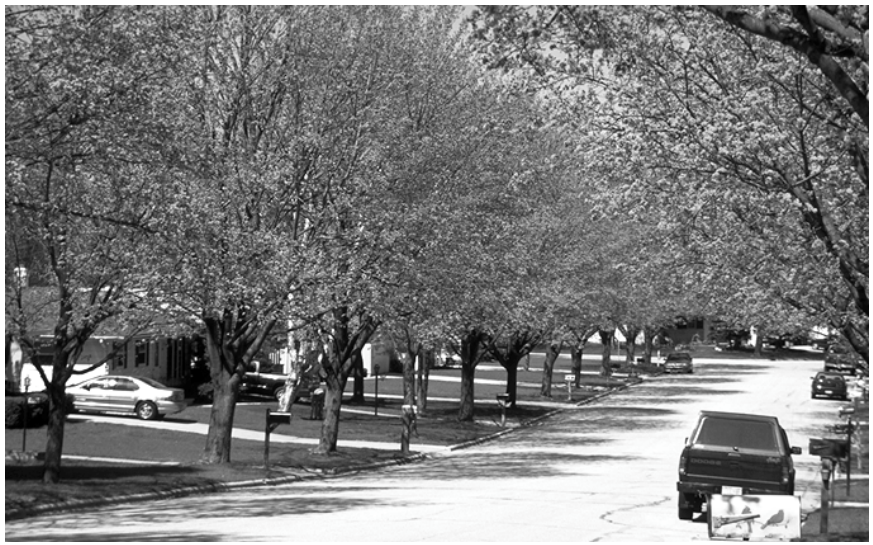
Access Management: Access should be managed on major streets to improve traffic flow and road capacity, always with a concern for neighborhood livability.

Appearance: The City should work to improve the appearance of the street and road system through landscaping, lighting and site planning.

Bicycling: Green Bay should continue to build a city-wide network of bicycle facilities serving both recreational and transportation functions. The City should require that bicycle lanes be installed with most new arterial or collector roads. The City and Brown County should both play a role in creating a county-wide network of bicycle paths in public greenways.

Walking: Green Bay should improve its sidewalk network and pedestrian streetscape amenities. Facilities should be provided for pedestrians in all residential neighborhoods. Green Bay should create a network of pedestrian paths in public greenways.

Transit System Enhancements: Investments should be made in Green Bay Metro to improve facilities and service to make transit a more attractive alternative in Green Bay.



Plan Overview

Goal: Improve the transportation system to ensure the safe and efficient movement of people and goods, and provide a variety of mode choices, while enhancing neighborhood livability and resident quality of life.

Summary of Objectives

Objective 1 – Balanced and Efficient Transportation System. Provide a balanced and efficient transportation network that offers viable alternatives to driving and maximizes use of existing investments.

Objective 2 – Smart Growth and Land Use. Coordinate the provision and improvement of transportation infrastructure with revitalization projects and compact, directed growth as defined in the Land Use Plan.

Objective 3 – Transit Oriented Development. Promote development in certain corridors and districts that encourages transit ridership.

Objective 4 – Thoroughfare System. Work with WisDOT, Brown County, and the MPO to maintain a thoroughfare system that ensures:

- Safe and efficient movement of people and goods
- Efficient and cost-effective use of public resources
- Minimal negative impacts to adjacent land uses and the community
- Consistent, predictable and comfortable driving environments

Objective 5 – Traffic Forecasting and Management. Mitigate traffic congestion when and where necessary to maintain traffic flow and minimize travel delays with a balanced approach that respects community values.

Objective 6 – Neighborhood Streets. Design neighborhood streets with facilities for automobile, bicycle, and pedestrian travel, while limiting the impacts of traffic.

Objective 7 – Pedestrian Environment. Improve pedestrian connections to create a continuous and seamless pedestrian system, and enhance the pedestrian environment to create a more walkable community.

Objective 8 – Transit. Work with Green Bay Metro to provide transit service, as feasible, throughout Green Bay, and connections to surrounding municipalities and major destinations. Extend routes as feasible to areas of new growth. Establish transit corridors where intensification of development is encouraged to support a viable ridership base.

Objective 9 – Intercity Bus. Help maintain viable intercity bus service.

Objective 10 – Bicycle Network. Continue to build a connected bicycle and trail network that is viable, convenient, and safe, and which will encourage utilitarian and recreational bicycling.

Objective 11 – Parking Management. Provide for parking as part of an overall approach to land development that also considers the desired intensity of use, access by alternative modes, availability of on-street parking, and the pedestrian environment.

Objective 12 – Passenger Rail. Work with WisDOT, Amtrak, and other agencies to bring passenger rail service to Green Bay.

Objective 13 – Freight Railroads. Maintain and promote City rail access and ensure safe crossings and mitigate impacts to neighborhoods and the downtown.

Objective 14 – Airport. Coordinate with Brown County and the administrators of Austin Straubel International Airport in their effort to maintain and improve passenger and freight services, while minimizing impacts to surrounding neighborhoods.

Objective 15 – Trucking. Provide for the safe and efficient movement of truck traffic through Green Bay while minimizing negative impacts to neighborhoods.

Objective 16 – Waterways and the Port of Green Bay. Work with Brown County and Port of Green Bay to maintain access to and the viability of port facilities.

A Smart Growth Approach to Transportation Planning

In order to lay the foundation for recommendations in the form of objectives and policies, this section provides background material on current transportation planning concepts and practices.

Because the provision of transportation infrastructure and movement of vehicles creates localized impacts, an approach is necessary that balances the goal of mobility with the protection of community livability. As the City of Green Bay and its surrounding region grows, constraints to the expansion of the roadway system, in both fiscal and political terms, may become more prevalent.

Therefore, the Transportation Plan for 2022 proposes a number of concepts for managing the fiscal and physical impacts associated with the transportation system, by recognizing that steps can be taken to reduce the demand for vehicle trips, that transportation planning should balance capacity and livability, and that strategies are available to maximize the capacity of the existing roadway system while reducing impacts on neighborhoods.

Land Use, Development Patterns and Trip Demand

Many factors in the basic organization of daily life contribute to the production of trips in a modern community, most importantly the separation of place of work and school from the home, and distribution of goods, services, entertainment, and recreation activities at centralized locations. The location, mix, and design of daily destinations greatly impact the demand on the transportation system, which connects the locales where different activities take place. Land use and development patterns greatly impact trip demand and travel behaviors.

The importance between land use and transportation should not be underestimated. Land use patterns and development are often seen as driven only by market forces, leaving public agencies to respond to the transportation demand created in their wake. However, public policies have shaped those land use decisions, whether it be through zoning regulations or minimum parking requirements. Therefore, land use planning and policies need to be viewed from the transportation perspective and vice-versa.

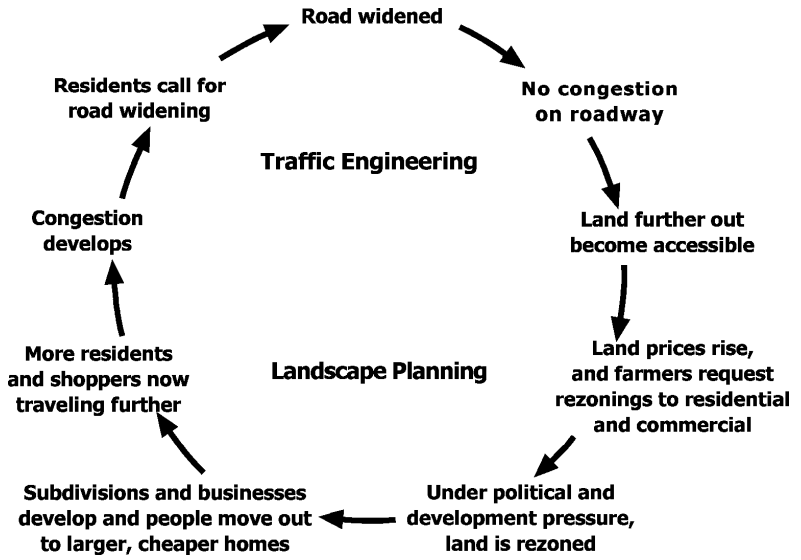
Cities with large, exclusive land-use zones connected by wide arterial roadways have produced an urban form oriented toward and dependent on the private automobile. For instance, a trip in an automobile may be required to get from a residential subdivision to a shopping center. Economies of scale in retailing reinforce this trend to separate uses, with the centralized "big box" replacing strip malls, which had replaced corner shops and downtown shopping districts. Creation of large surface parking lots around shopping centers or office buildings increases the walk distance between destinations, even encouraging auto trips between different outlets in a single shopping center, or a lunch trip between an office complex and nearby fast food restaurant.

In some instances public ordinances enforce separation and site designs that increase trip demand, in other cases private real estate development practices lead the form-making process. Transportation planning often responds with a call for new roads. This cycle of land use and transportation decisions feeds on itself to produce low-density, segregated development patterns (frequently called sprawl)

that leads to increased traffic and congestion, which is generally addressed by building more capacity, thereby creating access further out for similar types of development. This transportation and development cycle is depicted in Figure 19-1.

For Green Bay, this land use and transportation cycle is problematic for several reasons. First, the amount of developable land in Green Bay is limited, while land on the urban fringe is available at a lower cost. New development outside the city will increase traffic in the city and across the region. Second, the cost of expanding the roadway system will continue to rise, and there will be higher maintenance and reconstruction costs as miles traveled per vehicle increases. Consideration of new methods for addressing the relationship between development patterns, trip demand, and the provision of transportation infrastructure is a key part of the overall smart growth strategy for Green Bay.

Figure 19-1: Transportation and Development Cycle

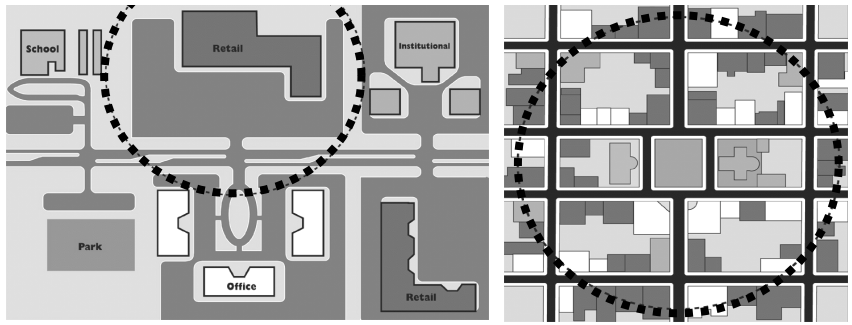


Street Grid Street versus Conventional Street Development Patterns

A majority of the City of Green Bay is laid out on a grid of streets which form regular development blocks. Within older sections of the city developed before the mass production of automobiles, especially downtown, a mix of uses is found that allows for access between destinations by walking. This contrasts with areas of the city built to accommodate access via automobiles such as West Mason Street, which displays successively larger, segregated land use zones in proportion to the distance from downtown. The newest area west of Highway 41 has very large zones, where "big box" retail outlets are located, and where walking between destinations is discouraged by the scale of development, the width of Mason Street, and the lack of sidewalks.

Figure 19-2 depicts a development pattern shaped along a conventional highway arterial or a grid of streets. The dotted circle represents a 500 foot radius, generally considered a comfortable walking distance. The same land uses and parking are included in both images. However the arrangement and mix of land uses in the grid pattern allows for a variety of activities to be accessible within a short walking distance. In the conventional street development pattern, driving trips are required to load onto or cross the arterial street to access other nearby land use zones with nearby destinations.

Figure 19-2: Conventional (left) versus Grid Development Pattern

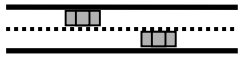
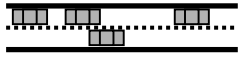
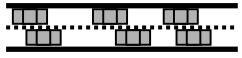
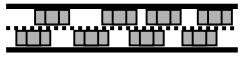
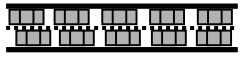


In contrast, the mixed land use grid pattern creates a "park once" environment and reduces the total number of automobile trips. Driving within the grid street pattern allows local trips to avoid arterial streets by using local streets.

The conventional approach segregates residential areas from commercial areas, requiring all trips to funnel to arterial streets; regardless of how close a residential area may be to a commercial area. In contrast, the grid development pattern, where housing is less segregated from commercial and work locations, results in shorter driving distances and more walk, bike and transit trips.

The general focus of smart growth planning is creating cities with concentrated mixed land uses that provide viable transportation choices that offer attractive neighborhoods.

Figure 19-3: Levels of Service Descriptions

Level of Service		Description
A		**FREE FLOW.** Low volumes and no delays.
B		**STABLE FLOW.** Speeds restricted by travel conditions, minor delays.
C		**STABLE FLOW.** Speeds and maneuverability closely controlled due to higher volumes.
D		**STABLE FLOW.** Speeds considerably affected by change in operating conditions. High-density traffic restricts maneuverability, volume near capacity.
E		**UNSTABLE FLOW.** Low speeds, considerable delay, volume slightly over capacity.
F		**FORCED FLOW.** Very low speeds, volumes exceed capacity, long delays with stop-and-go traffic.

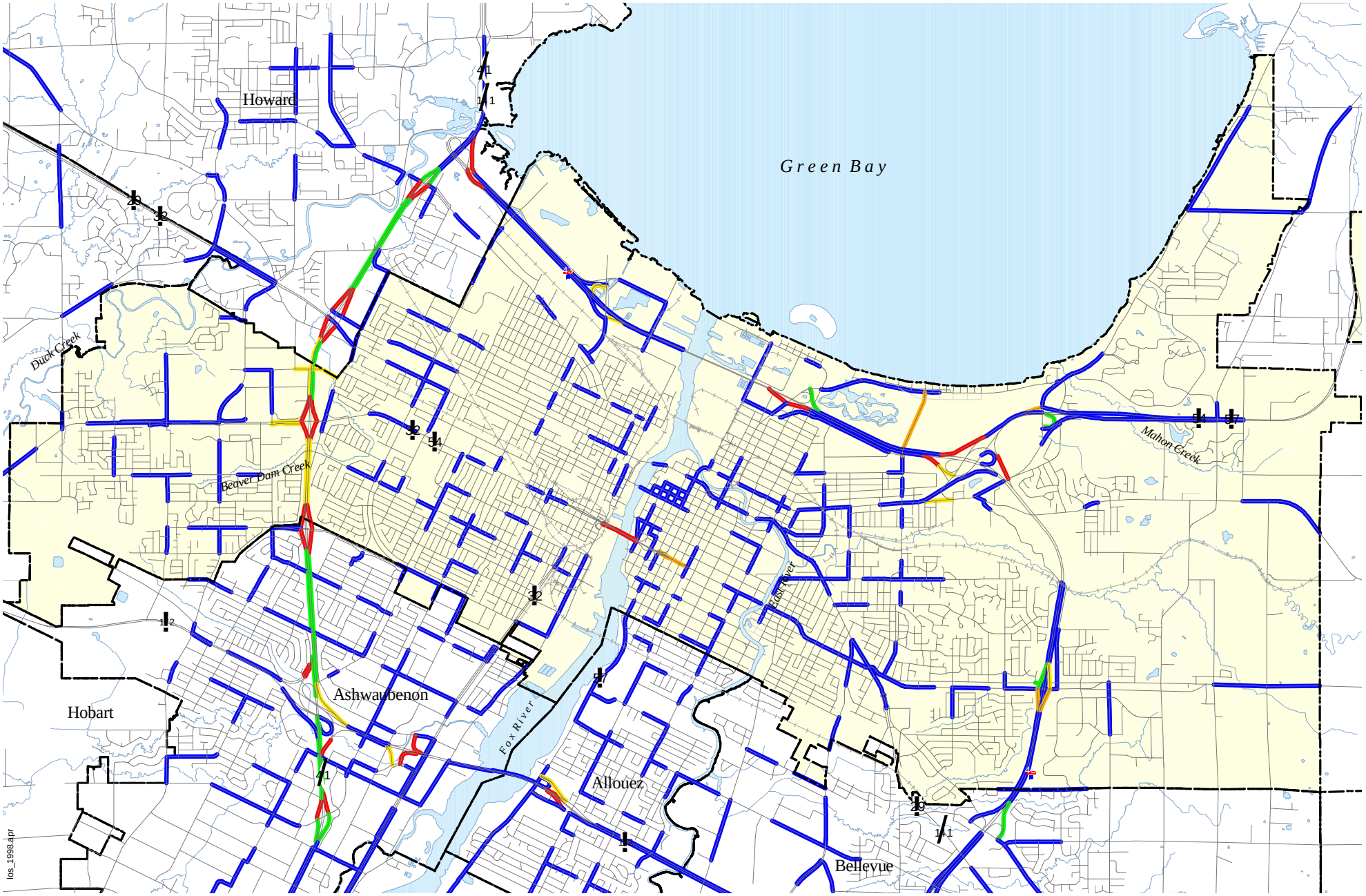
Traffic Analysis and Management

A main concern that drives much of transportation planning is roadway capacity and congestion. At the present time, Green Bay typically does not seem to have significant capacity problems. Forty-eight percent of respondents of the Comprehensive Plan Public Opinion Survey disagreed (40.8 percent) or strongly disagreed (7.2 percent that traffic congestion was a problem in Green Bay, while 42 percent agreed (28.4 percent) or strongly agreed (13.6 percent) that it was a problem. The survey responses suggest that traffic congestion is not perceived as a major problem.

Traffic congestion is generally qualified as an assigned Level of Service (LOS) based on the traffic characteristics given an estimated traffic capacity (see Figure 19-3). Based on 1998 Annual Average Daily Traffic (AADT) and the generalized capacity limits used in the Green Bay area travel demand model, LOS conditions were determined for Green Bay's functionally classified streets (see Figure 19-4). Because of the general nature of this analysis, specific congestion problems related to intersections, driveways access, or other unique road characteristics are not illustrated on the following maps. Furthermore, because the analysis is based on daily traffic counts, peak hour characteristics unique to specific roads are not included in the analysis.

The Level of Service (LOS) Analysis illustrated in Figure 19-4 suggests that most functionally classed roadways are currently operating at LOS "C" or better. The Mason Avenue bridge near downtown is the exception, which the model shows to be operating at LOS "F". However, observation suggests that the capacity of this section is of Mason Avenue is underestimated in the model.

US 41 between SH 172 and I-43 is currently operating at a LOS "C" and "D", which appears consistent with current travel conditions.



1998 LOS

- LOS B
- LOS C
- LOS D
- LOS E
- LOS F
- Local road
- Railroad

Wisconsin Department of Transportation Annual Average Daily Traffic (AADT) counts for 1998.

Level of Service analysis based on roadway capacities from Brown County Travel Demand Model

Figure 19-4

1998 Traffic Level of Service

0 2000 4000 8000 feet

NORTH

Figure 19-5: Conventional Approach to Transportation Planning

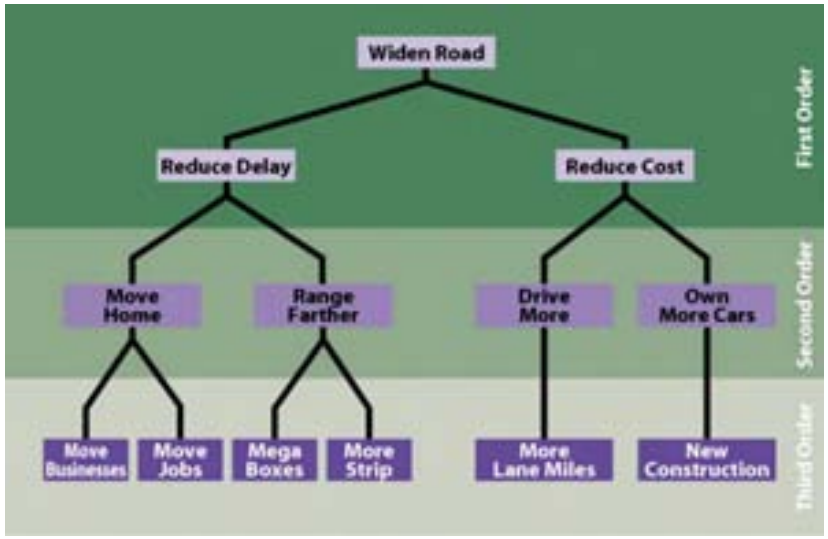
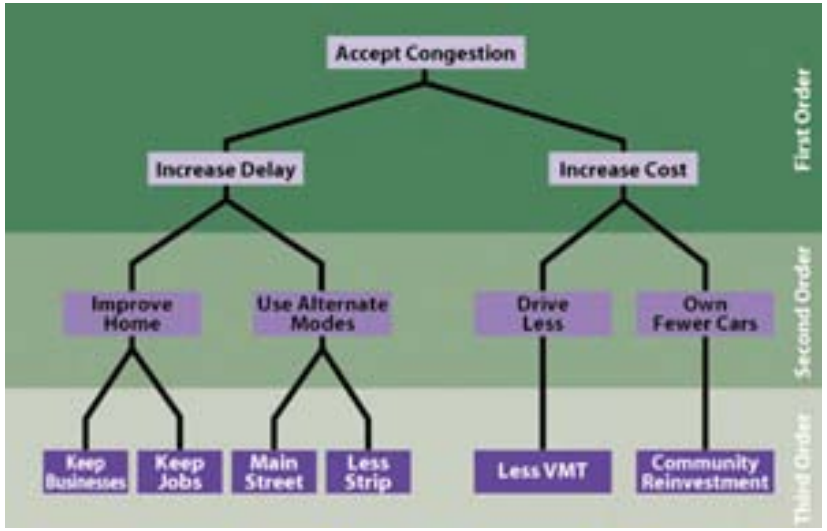


Figure 19-6: Multi-modal Approach to Transportation Planning



Congestion Mitigation

The traditional response to congestion, or forecasted congestion, has been to widen roads and increase capacity, which initially reduces travel delays and personal travel costs. However, the increased time savings and reduced personal travel costs have at times resulted in unintended consequences, such as development shifting farther out. Figure 19-5 illustrates some of the unintended consequences of traditional road improvements.

In contrast, accepting congestion increases travel delays and personal travel costs, which may result in modified behavior to avoid long commutes. For instance, some people may decide to improve an existing home rather than moving further out, or they may decide to move closer to daily destinations (e.g., work or school). Some people may decide to use public transit, if it offers a time or cost savings. Thus congestion can result in keeping businesses and jobs, maintaining main streets and reinvesting in businesses closer to the center of the city, thus producing less travel and freeing money for other needs (see Figure 19-6). While the outcomes identified in these figures are influenced by a variety of factors, how traffic congestion is addressed does play a role in affecting these outcomes.

Congestion is clearly a problem for those who are sitting in traffic. However, the long term impacts of congestion may be viewed as negative when balanced with other community values. The purpose of this simplistic illustration is not to suggest that capacity improvements should never be made, but that capacity improvements may have consequences that are less desirable than the congestion itself. Therefore, the response to congestion, particularly forecasted congestion, should not automatically be capacity expansion. If a travel demand model forecasts congestion, then further study is needed to better determine congestion mitigation strategies.

Smart growth land use planning that provides for a balanced transportation system is the long term solution to traffic congestion. However, these changes will occur slowly over time. Therefore, the

City should simultaneously pursue strategies, such as those described below, that will reduce the impacts of congestion in cost-efficient ways that are compatible with other goals and values of the community.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM), as the name describes, addresses the demand side of transportation. The TDM approach to congestion mitigation focuses on user demand and behavior modification strategies to reduce drive-alone and peak-period travel. These strategies may include: incentives for using transit or carpooling; encouraging flexible work time to decrease peak hour travel; or, promoting mixed land uses that allow people to live closer to work and other daily activities.

Large employers in the community add significantly to the peak hour transportation demand. Large employers are in a better position to make policy changes that can affect traffic impacts near their work sites. One TDM technique is to encourage work hour rescheduling (flextime) for some of the largest employers in the region. This technique decreases peak hour demand by spreading out commute trips over a longer time period.

Free or subsidized employee parking is a benefit many workers value. However, it is only a benefit if the employee drives to work. Employers can affect travel demand by converting free or subsidized parking benefits to a transportation monetary or "cash-out" benefit. Such a program would provide employees a cash benefit equivalent to the value of a current parking space. All employees would then have a choice of how to use their transportation benefit whether they drive or not.

While many would likely choose to use the benefit to pay for parking, others may choose to save some or all of the money by taking transit, carpooling, walking, or biking. The advantage of such programs is that it does not take away from an existing benefit, but it does increase employee choices of how to use the benefit. Cash-out parking programs are particularly useful in downtown locations or in areas where parking is in short supply and/or where providing additional parking would be expensive (e.g. hospitals).

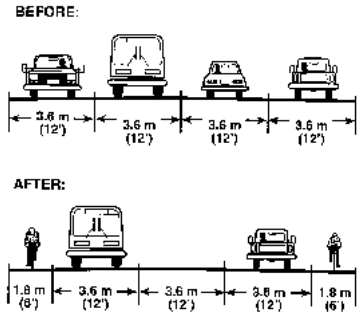
Traffic Management and Neighborhood Livability

In order to conserve neighborhood and community livability, congestion, or the threat of congestion, should not automatically dictate an increase in roadway capacity. Furthermore, when and where capacity improvements are made, they should be designed to minimize negative impacts to neighborhoods.

Adding travel lanes or widening roads can often result in increased traffic speeds, noise, and more traffic that can negatively impact adjacent property. Therefore, strategies should be implemented that allow for efficient traffic flow while minimizing negative impacts.

Four-Lane to Three-lane Configuration

Studies suggest that the conversion of a four-lane undivided road to three lane road (i.e., one lane in each direction and a two-way left turn lane (TWLTL) can improve safety and maintain an acceptable level of service. The three lane configuration can take several forms that can vary in design.



The TWLTL can be a continuous left turn lane or it can be painted as dedicated left turns only at intersections, which is desirable where there are no driveways between intersections. Repainting roadway lanes from a four-lane undivided roadway to a three-lane configuration is relatively inexpensive. However, if it is determined that the three-lane configuration will remain in the long term,

constructing planted medians between dedicated turning lanes will calm traffic more, create a pedestrian refuge, and create a more attractive "parkway-type" environment.

Case study results of four-lane to three-lane conversions indicated:

- A reduction of average and 85th percentile speeds (typically less than five miles per hour)
- A relatively dramatic reduction in excessive speeding (a 60 to 70 percent reduction in the number of vehicles traveling five miles per hour faster than the posted speed limit was measured in two cases)
- A reduction in total crashes (reductions between 17 to 62 percent were measured).

Four-lane to three-lane conversions have been done on roads with average daily traffic volumes between 8,400 to 24,000 vehicles per day. Computer simulation analyses confirmed case study impacts.[1]

A four-lane undivided to three-lane conversion should be considered a feasible option (with respect to volume only) when bi-directional peak-hour volumes are less than 1,500 vehicles per hour. However, some caution should be exercised when the roadway has a bi-directional peak-hour volume between 1,500 and 1,750 vehicles per hour.

A number of feasibility factors should be considered in determining a four-lane to three-lane conversion. These factors include:

- Roadway function and environment
- Overall traffic volume and level of service
- Turning volumes and patterns
- Frequent-stop and slow-moving vehicles
- Weaving, speed, and queues
- Crash type and patterns.
- Pedestrian and bike activity.
- Right-of-way availability, cost, and acquisition impacts.
- General characteristics, including:
  - -- Parallel roadways
  - -- Offset minor street intersections
  - -- Parallel parking
  - -- Corner radii
  - -- At-grade railroad crossings.

Four-lane undivided roadways should be considered for three-lane conversions when:

- Existing average and/or 85th percentile speeds are not appropriate given corridor land uses (traditional neighborhoods or commercial areas with short setbacks)
- Speed variability creates safety concerns and/or noise problem
- The road is near pedestrian activity areas, such as parks and schools or where improving the pedestrian environment is a priority
- The road is an existing or planned bicycle corridor
- High crash rates exist due to turning movements, excessive weaving, and/or stop and go traffic.

Transportation System Management

Transportation System Management Strategies consist of a variety of lower-cost strategies that maximize traffic flow, capacity, and safety. These strategies include:

- Access management
- Advanced traffic signal control systems
- Intersection improvements
- Grid pattern streets.

[1] *Guidelines for the Conversion of Urban Four-Lane Undivided Roadways to Three-Lane Two-Way Left-Turn Lane Facilities*, Center for Transportation Research and Education., April, 2001.

Access Management: Access management is the control and regulation of the spacing and design of driveways, medians, median openings and traffic signals. These strategies can increase capacity, improve traffic flow, enhance safety, and when combined with a streetscape plan, create an attractive multi-modal environment. These strategies have been implemented on many Green Bay area roadways.

Access management strategies can hasten through-traffic movements, limit travel time delays, and improve safety while maintaining an appropriate speed compatible with adjacent land uses. The following strategies should be considered along congested corridors and as part of an overall access management plan:

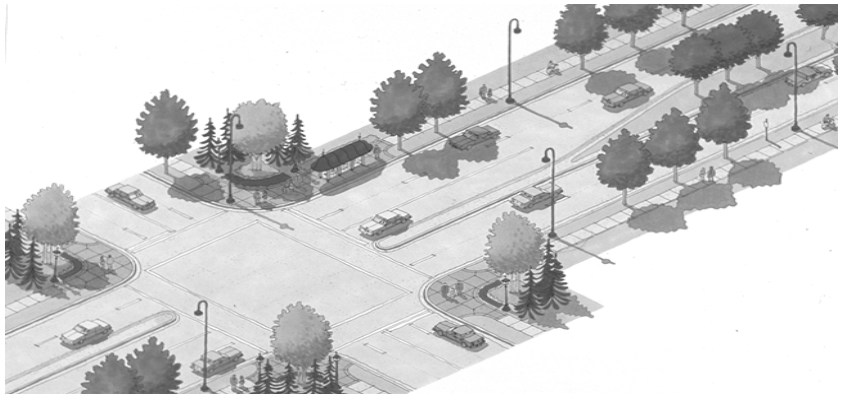
- Controlled left turns
- Raised medians
- Combined driveways
- Driveways located away from intersections
- Driveway accesses from cross streets where possible.

While frontage roads have been used as an access control measure, they are not necessary where the grid pattern street system provides multiple access opportunities. Furthermore, existing frontage roads within the area were identified as inefficient and unsafe in the *1997-1999 Green Bay Metropolitan Area Intersection Crash Study*. Because of the safety problems created by frontage roads, and because they create an additional barrier for pedestrians and bicyclists, frontage roads are not recommended.

Sufficient traffic flow through the city via principal and minor arterials does not have to be at odds with creating livable and safe neighborhood streets. As described in the *Analysis of Conditions and Identification of Issues*, traffic capacity is actually maximized at speeds between 25 and 30 mph. When a streetscape program with a pedestrian-friendly design is combined with access management strategies, as shown in Figure 19-7, the following benefits can be realized:

- More consistent traffic flow and speed
- More predictable driving environment
- Increased capacity and safety due to removing left turning vehicles from through-lane
- Improved safety due to right turning vehicles consolidated to fewer driveways
- Traffic calming effect of street trees in median and between road and sidewalks
- Improved safety by pedestrians having to cross fewer driveways
- Raised medians providing a pedestrian refuge at street crossings
- More comfortable pedestrian environment with street trees providing a buffer between the drive lane and sidewalk, and lower travel speeds.

Figure 19-7: Streetscape Plan with Access Management



Advanced traffic signal control systems: Traffic signal improvements can improve capacity at intersections and more efficiently allocate "green time" to particular movements based on demand at particular times of the day. Traffic signal upgrades and timing adjustments are a cost-effective means or improving and

optimizing traffic flow. According to the Institute of Transportation Engineers (ITE) 15 percent of intersections would benefit from signal timing adjustments alone, without any hardware changes. [2]

By interconnecting and coordinating traffic signals and instituting timing plans and a central master control system, traffic flow can dramatically be improved. Such systems can integrate volume-density actuated controllers that can account for traffic volumes and patterns throughout the day.

A roundabout at Lineville Road and Cardinal Lane in Howard

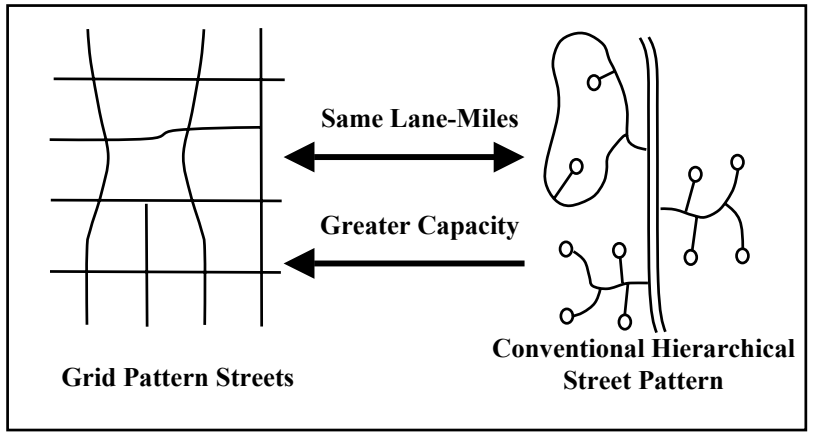
Intersection improvements: Improvements to intersections, via traffic control devices or design changes can increase traffic flow, reduce congestion, and improve safety. The use of roundabouts is one such design change that has proven to be a successful and cost effective means of increasing traffic flow, reducing delay, and enhancing both pedestrian and vehicular safety in the Green Bay metro area. Several roundabouts have been constructed in Brown County, including two along Lineville Road at the intersections at Cardinal Lane and Rockwell Road in the Village of Howard.

The Brown County Planning Commission conducted a study of the Lineville Road roundabouts and found that not only did they reduce traffic delays, improve traffic flow and intersection capacity, but they reduced speeds in a school zone, decreased accident rates, and improved conditions for pedestrian and bicycle safety. The cost of constructing and maintaining roundabouts have been shown to be significantly less than installing and maintaining traffic signals.

Grid Pattern Streets: Much of Green Bay is constructed on a grid pattern or a modified grid pattern street network. As described in the discussion above, there are some clear advantages to grid pattern street networks including:

- Greater overall road capacity
- Increased route choices for local trips
- Direct routes for biking and walking.

Figure 19-8: Grid Street vs. Conventional Street Patterns



[2] *Twelve Tools for Improving Mobility and Managing Congestion.* Washington, D.C.: Urban Land Institute, 1991.

Grid pattern streets still maintain a hierarchical street function as described in the functional classification section. However, traffic is more dispersed throughout the road network. Because of traffic dispersion and increased route options, a grid pattern street network has greater capacity than the conventional street pattern where all local and collector roads funnel onto a single arterial street (see Figure 19-8).

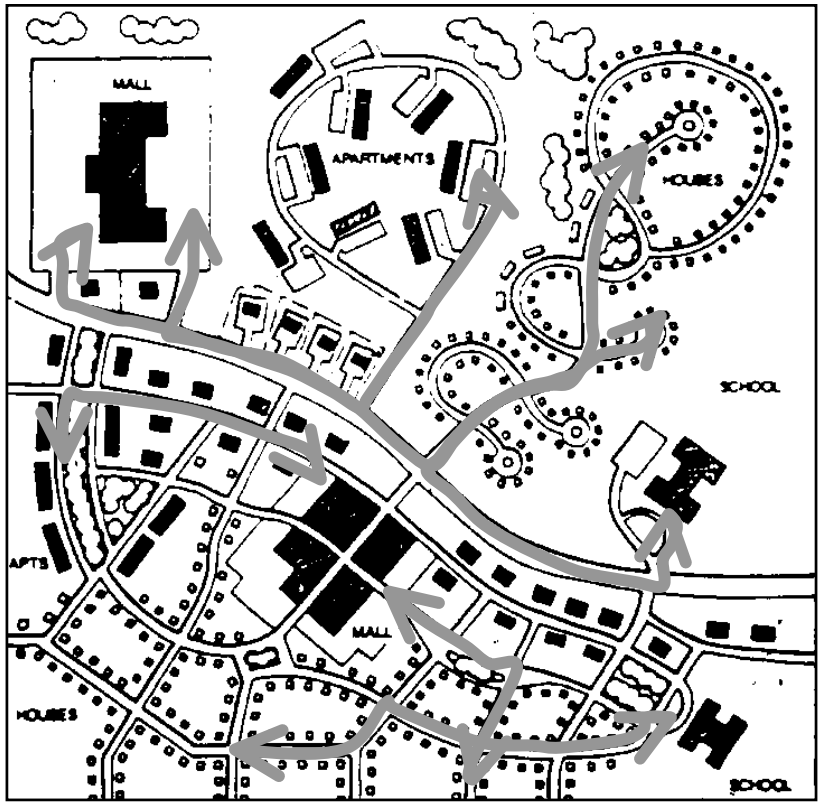
Figure 19-9 illustrates, in a slightly exaggerated manner, the relationship between development type and street pattern. The diagram shows an arterial roadway serving two distinct street patterns. The top half of the figure illustrates a hierarchical or "dendritic" road network with segregated land uses, typical of most suburban development. The bottom half of the figure depicts the same land uses on a grid pattern or modified grid pattern street network.

The purpose of principal arterial streets is primarily to accommodate longer trips. However, the conventional road network requires all trips, regardless of distance, to load onto the arterial roadway. As a result, the arterial street must accommodate local trips as well as long distance trips. Furthermore, once the arterial reaches a point of congestion, the only alternative available to travelers is to sit in congestion or not make the trip. It has been estimated that this type of street and land use pattern results in local trips accounting for up to 60-70 percent of arterial traffic.

In contrast, the grid pattern street network allows local trips to use alternative routes and avoid the arterial streets entirely. This image also illustrates how land use placement and mix can result in shorter trip distances, which make walking and biking more viable alternatives.

From a pedestrian perspective, the suburban road network and land use pattern creates long walking distances between land uses. Furthermore, pedestrians must walk along high-speed noisy arterial

Figure 19-9: Development on Interconnected vs. Conventional Street Pattern



streets and cross multi-lane intersections to get to destinations. As a result, pedestrians experience an uncomfortable and unsafe walking environment, assuming that pedestrians are willing to make the trip at all.

In contrast, the grid pattern development allows pedestrians a direct route and walkable distance to destinations on local roads. As will be described later, local roads can and should provide a comfortable, safe and attractive pedestrian environment.

Grid pattern streets should still follow a functional class hierarchy where design is a critical aspect of how the street will function. Arterial streets should be designed to provide for convenient travel flow that will be attractive to longer distance through-trips, whereas local streets need to be designed to accommodate low speed, shorter distance trips. Roadway design should encourage traffic to drive at speeds and in a manner that is appropriate to the adjacent land uses and street functional classification.

It has been argued that cul-de-sacs are desirable and that houses at the end of cul-de-sacs sell at premium prices because people do not want traffic in front of their house. This should not be a surprise, if the options are between a house on a street with traffic and a house on a street with no traffic, most would choose the house with no traffic. However, neighborhoods with grid pattern streets can and do provide low-volume roads, which when designed properly provide desirable housing options with minimal traffic impacts. These grid pattern neighborhoods also offer environments that provide safer, more comfortable, and attractive places to walk and bike.

Neighborhood Streets

Grid Pattern Residential Streets: As previously discussed, grid pattern streets are an important element in providing traffic alternatives and reducing local trips on arterial streets. Furthermore, grid pattern streets allow convenient and direct walking and biking access to destinations.

Narrow Streets: Narrow streets have been shown to reduce traffic speeds, creating a quieter, safer, and more comfortable pedestrian- and bicycle-friendly neighborhoods. Narrow streets benefit developers by reducing costs and benefit the City by reducing maintenance, snow removal and reconstruction costs. Weekly alternative-side parking can allow for street cleaning and snow removal. Although narrower streets may create some challenges for emergency vehicles, extra planning efforts should be able to address those issues.

Safety: It is often assumed that wider roads are safer roads. While it is true that "upgraded" roads decrease the number of accidents per vehicle mile, these statistics can be misleading since they do not take into account the extra trips and the increased length of trips that such upgrades encourage. However, accident rates per trip or per hour spent on the road remain much the same for narrower streets as for wider roads. Furthermore, straighter and wider roads encourage higher speeds. As a result, the accidents that do happen tend to be more severe, resulting in more injuries or a greater likelihood of death. Greater discussion of safety is included in the pedestrian section.

Emergency Vehicle Access: One of the greatest concerns in narrowing streets is that emergency vehicle access will be limited. One of the important aspects of narrow streets is that they are within a grid pattern system so that any individual property has access from two directions. In older neighborhoods, the alley provides an additional access point. Still, emergency response personnel should

be involved in providing input as street patterns are identified. A system of minor and major emergency routes can be established to ensure that access into neighborhoods are adequate.

It is important to note that creating narrower streets is a proven strategy for creating safer, more livable streets, that promote walking and biking. These safety, health and quality of life outcomes need to considered and balanced with emergency vehicle access issues.

Pedestrian Safety: According to American Association of State Highway Transportation Officials (AASHTO), "the number of accidents increases with an increase in the number of decisions required by the driver." A corollary is that "the actual and potential effects of each driver-decision become more significant as the speed of the particular motor vehicle increases." [3]

The actual distance traveled by the vehicle as it slides to a stop after the brakes have been applied is five times more at 40 mph than at 20 mph. This is a function of physics not related to driver skill or awareness. Even from 20 mph to 30 mph braking distance required to stop is 2.5 times longer.

The risk of very serious injury to a pedestrian increases dramatically as the speed of an impacting vehicle exceeds 20 mph. The probability of fatal injury becomes likely from initial impact alone as vehicular speeds reach and exceed 35 mph. The probability of receiving fatal injuries is:

- 3.5 percent at 15 mph
- 37 percent at 31 mph
- 83 percent at 44 mph.

[3] *Traditional Neighborhood Development Street Design Guidelines,* the Institute of Transportation Engineers (ITE), June 1997.

Other research has shown that pedestrians are usually not seriously injured when hit by a car moving at a speed of less than 20 mph at the time of impact. Between 20 and 35 mph injuries are usually serious, while at or above 35 mph they usually endanger life or are fatal. Another study found that the probability of receiving fatal injury is 15% in a 20 mph zone and 60% in a 30 mph zone.

"Safety" is a relative term, and its accommodation in street design situations requires the consideration of many, sometimes competing elements. It is impossible to design any real-world situation that is entirely safe for all possible purposes. An unsafe condition can be created by a wide variety of means that are beyond the control of designers; those most affecting street design being human error, vehicular failure, and roadway conditions. In street design the following questions should be asked by designers relating to safety matters:

- What actions may reasonably be expected of motorists and non-motorists along the particular street?
- Given a particular and foreseeable but infrequent problem (i.e., a speeding vehicle) what are the ramifications to other users of the street if the particular problem is specially accounted for by the design?
- When balancing conflicting matters, the frequency of conflict between the two or more competing elements and the resultant frequency of difficulties that will be experienced should be documented and carefully considered.
- What are the physical consequences of a particular design element or decision?
- If fairly in doubt, favor the non-motorist and accommodate the motorist.

When a fair question exists concerning a particular design detail, favoring the non-motorist will usually result in the correct decision because:

- Motorists have the benefit (from a safety perspective) of travelling in a device designed to enclose, protect, and support the human(s) inside
- An inconvenienced motor vehicle will seldom result in a modal shift, but an inconvenienced non-motorist will often become a motorist to avoid inconvenience.

Roadway design is a vitally important component to pedestrian safety. As noted, vehicle speed is critical to pedestrian safety, and innovative design strategies can greatly improve pedestrian safety conditions. Roundabouts, for example can provide all of these benefits can be achieved without sacrificing traffic capacity:

- Lower vehicle speeds at intersection pedestrian crossings
- Minimize driver (and pedestrian) decisions
- Reduce vehicle/pedestrian conflict points as well as vehicle/vehicle conflict points

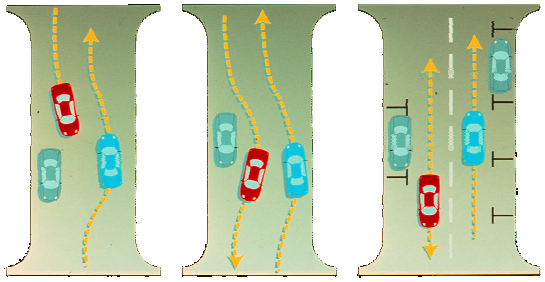
Traffic Calming: The Institute of Transportation Engineers defines traffic calming as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." The purpose of traffic calming is to slow traffic to increase safety, particularly to create a safe environment for children, seniors, and the disabled, and increase neighborhood livability. While traffic calming measures are usually applied to local residential streets, traffic calming is also appropriate for functionally classified streets in residential areas, pedestrian activity areas, and older commercial areas where buildings and sidewalks are close to the street.

Narrowing streets is a very effective traffic calming measure and may be appropriate for a wide variety of streets. Narrowing local streets with low traffic volumes can be particularly effective since a shared through-lane can be used to accommodate both directions of traffic. Figure 19-10 illustrates how vehicles interact on narrow local streets with a shared through-lane by yielding to on-coming vehicles or passing on-coming vehicles slowly.

New 24-foot wide street with parking on one side.

In existing neighborhoods where it will be some time before streets are reconstructed, other traffic calming strategies may be useful. It may also be desirable to implement traffic calming even on narrow streets where a special need is identified, such as near schools, parks and other high pedestrian use areas.

Figure 19-10: Yield, Slow and Free Flow lanes



Traffic control devices, such as stop signs and speed limit signs, differ from traffic calming measures, in that they are a regulatory measure that requires enforcement. Traffic calming measures are intended to be self-enforcing.

Traffic calming strategies vary dramatically in type, design, and function. In Green Bay, traffic calming strategies should focus on slowing traffic to appropriate speeds and not diverting traffic from one neighborhood street to another. Traffic calming measures that alter street width or the perception of street width are more comfortable for drivers than strategies that alter the physical road environment, such as speed humps (see Figure 19-11).

Traffic calming strategies can vary dramatically in cost and ease of implementation. Reconstructing streets can be expensive. However, allowing on-street parking may be an easy and inexpensive alternative.

Traffic calming programs are being implemented in many communities. The affected public should be involved in determining the most appropriate technique. Some programs require neighborhood petitions to initiate a study of traffic speeds. The process in Portland, Oregon, requires neighborhood input and approval from problem identification through final implementation. Such a process is useful in existing neighborhoods.

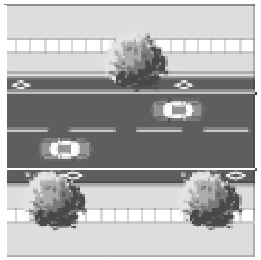
In new or redeveloped areas, traffic calming can be integrated in the street design. For example, traffic calming devices, such as bulb-outs, and/or raised intersections, should be considered in addition to narrow streets with new development.

Traffic calming devices vary considerably, and are not appropriate in all situations. People's perception of and response to these strategies may also vary. Many people who may have a very negative response to speed bumps, may support the use of intersection bulb-outs.

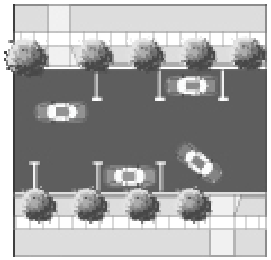
Whether to construct traffic calming devices, and which to use, should be thoroughly discussed in a neighborhood planning setting prior to installation to ensure that the device serves the appropriate function and is accepted by the neighborhood.

Figure 19-11: Traffic Calming Strategies

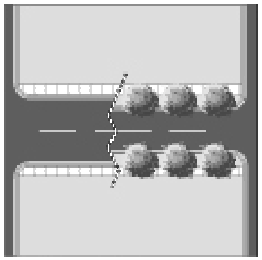
Narrowing the Street



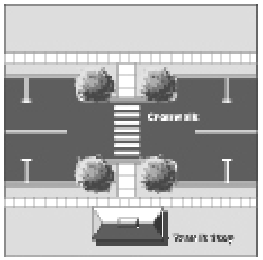
Stripe Lanes



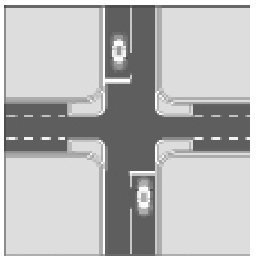
Parking



Rebuild Street

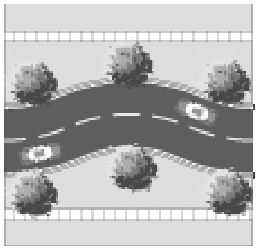


Mid-block Bulb-Out

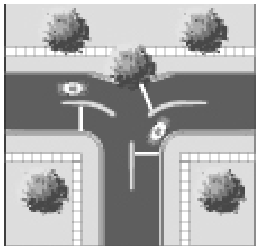


Intersection Bulb-out

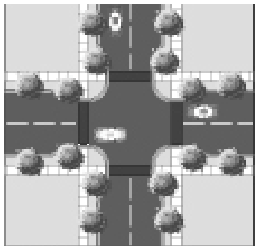
Deflecting the Vehicle Path and Sightline



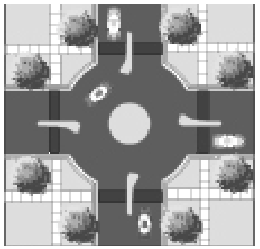
Chicane



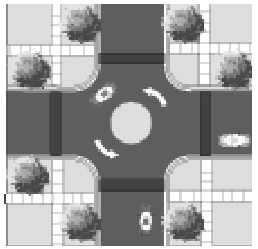
Modified Intersection



Knockdown

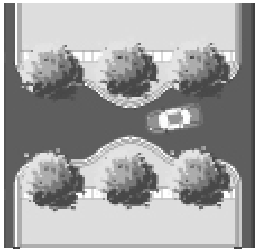


Roundabout

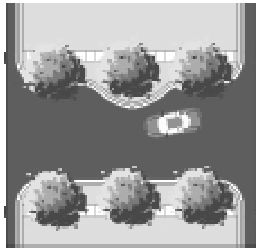


Traffic Circle

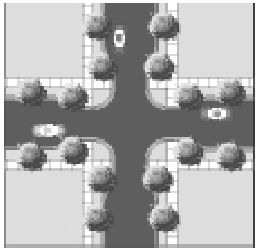
Sharing the Pavement



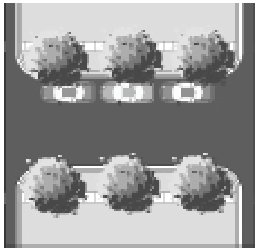
Centered Mid-Block Yield Point



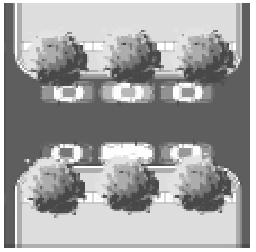
Offset Yield Point



Intersection Yield Point



On-Street Parking 1 Side



On-Street Parking 2 Sides

Objectives and Policies

The Transportation Plan Objectives and Policies respond to the issues identified and recommend approaches as discussed above. The section is organized by transportation mode.

Transportation System

Green Bay's transportation system is comprised of all the infrastructure and services in the city devoted to moving people and goods. The transportation system includes:

- Roads
- Transit services
- Sidewalks
- Bicycle routes and trails
- Airport
- Railroad lines
- Port and terminals

Issues specific to each of these transportation system components will be addressed under individual subheadings. However, transportation frequently, if not always, depends on connections between the modes in the system, for instance a truck route provides access for freight to the port. As a result, the recommendations begin with policies pertaining to the overall system.

Objective 1 – Balanced and Efficient Transportation System

Provide a balanced and efficient transportation network that offers viable alternatives to driving and maximizes use of existing investments.

Recommended Policies:

1. **Jurisdictional Cooperation and Coordination:** The City of Green Bay will work in a coordinated effort with WisDOT, Brown County, the MPO and adjacent communities in regard to transportation planning and investments in specific projects, with the common goal of producing a connected, multi-modal transportation system.

2. **Evaluate Projects for Multi-Modal Needs:** Transportation projects managed by the City will include an evaluation of the infrastructure needed for vehicles, buses, bicycles, and pedestrians.

3. **Mode Connectivity:** The City will work to bridge gaps that exist in the transportation system for some modes, particularly for the transit, pedestrian, and bike-route networks. Gaps between modes will also be considered, such as transit stops that are not adjacent to sidewalks. The City will:

    - Maintain its inventory map of road, pedestrian, bicycle and transit route facilities
    - Identify gaps in the system for each mode and problems with connectivity between modes
    - Develop criteria for prioritizing system connectivity issues and determining costs from which to assess the cost/benefit tradeoff for improving the connection.

4. **Alternative Mode Choices:** The City will work to develop infrastructure that supports alternative mode choices to the drive alone automobile trip.

5. **Transportation Demand Management (TDM):** The City should work with WisDOT, Brown County Planning Commission, and neighboring communities to develop and implement a Transportation Demand Management Plan to include strategies for increasing carpooling, transit use, walking, biking, flexible work times, and telecommuting in order to efficiently utilize existing transportation infrastructure and services.

Example of compact development consistent with transit-oriented development guidelines.

Smart Growth and Land Use

Because land use and transportation are intricately linked, land use decisions can have a dramatic impact on travel behaviors and traffic volumes. By implementing the land use plan's smart growth policies, the city will be creating a city with:

- More viable transportation choices
- Higher percentages of transit, walking, and bicycle trips and a lower percentage of drive alone automobile trips
- Shorter travel distances
- Fewer average vehicle miles traveled.

The land use plan should be viewed as the principal recommendation of the transportation plan. By increasing transportation choices and reducing the need for more and longer trips through the land use plan recommendations, the need for new and/or wider roads will be reduced.

Objective 2 – Smart Growth and Land Use

Coordinate the provision and improvement of transportation infrastructure with revitalization projects and compact, directed growth as defined in the Land Use Plan.

Recommended Policies:

1. **Compact and Contiguous Growth:** In order to shape and direct new growth, the City of Green Bay will plan and construct new roadways only in areas contiguous with existing development. The City will maximize the efficiency of its roadway system by seeking compact development patterns, which also make pedestrian, transit, and bicycle trips a viable choice.

2. **New Neighborhoods:** The City will work with developers to create new neighborhoods organized on a grid pattern of interconnected local streets where topography allows. A mix of land uses should be planned, including commercial nodes, to allow short walking trips.

3. **Infill and Redevelopment:** The City will promote infill and redevelopment in major transportation corridors and along transit routes.

4. **Older Neighborhoods:** The City will invest in older neighborhoods near the downtown employment core and other employment sites, which will encourage employees to live in close proximity to their place of employment and thereby reduce the vehicle miles traveled for commute trips.

5. **Activity Centers:** The City will require facilities providing access for pedestrians, bicyclists, and transit to major activity centers.

Objective 3 – Transit Oriented Development

Promote development in certain corridors and districts that encourages transit ridership.

Transit oriented development (TOD) should be promoted as identified in the land use plan. Appropriate development near bus stops and along bus lines can increase system ridership, help create interesting, sustainable neighborhoods or districts, help guide regional growth and broaden the range of choices in travel, residence and shopping.

The TOD policies addressed in the land use plan support and complement the following policies.

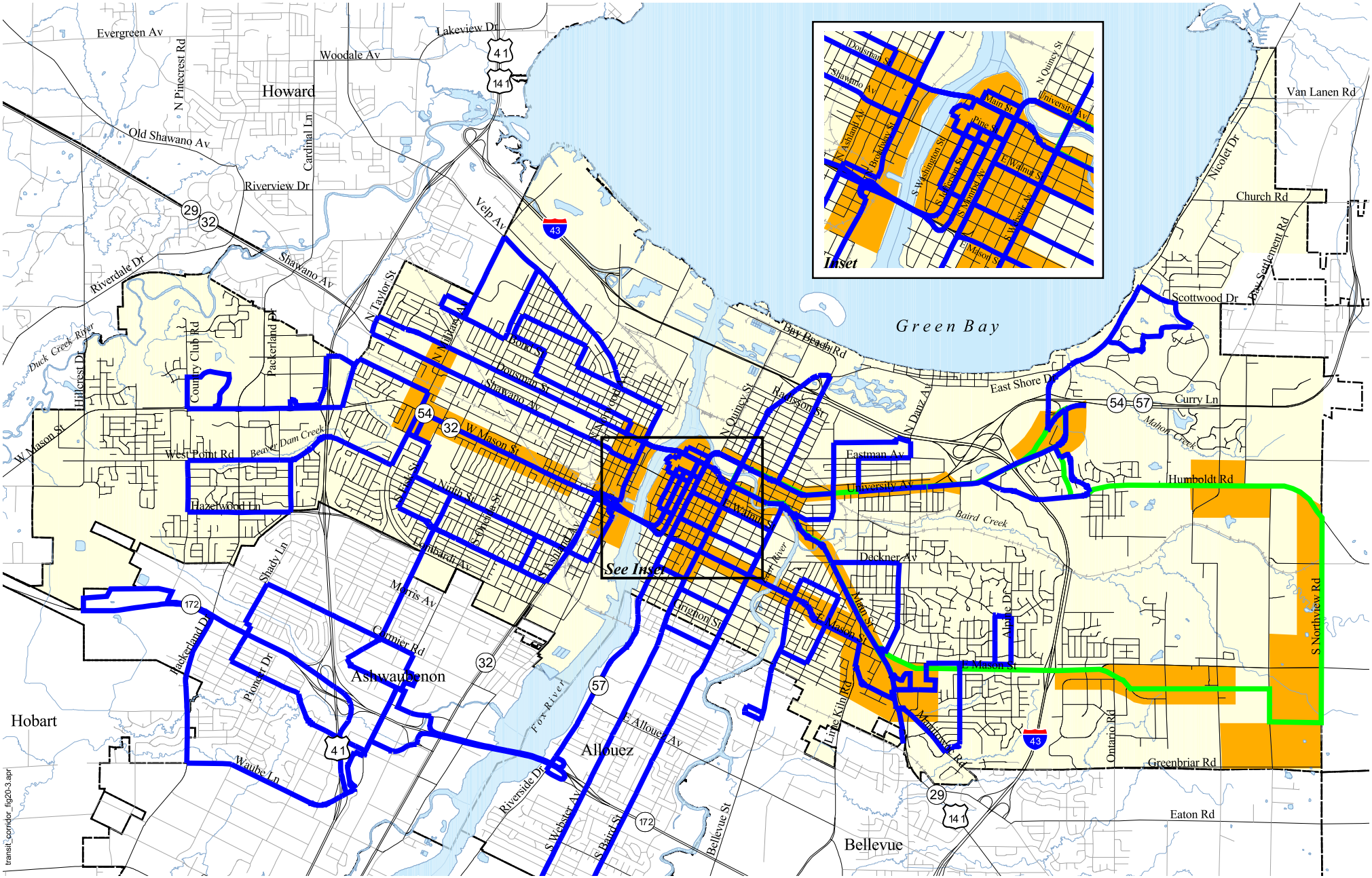
Recommended Policies:

1. **Emphasis Areas:** The City will seek to achieve transit-oriented development (TOD) in the corridors and districts identified on Figure 19-12.

2. **Transit-Oriented Development (TOD) Site Plan Guidelines:** TOD areas should be considered for more intense and mixed land use patterns as identified in the land use plan to create higher density development, particularly employment, shopping, and multi-family housing that is oriented toward pedestrians and served by transit, major roads, and bicycles lanes. Although the term transit-oriented development is used in this plan, the following recommended guidelines are for creating environments that make walking, biking, and transit use more viable alternatives while still accommodating auto traffic and are consistent with the other aspects of *Smart Growth 2022*.

   TOD areas should adhere to the following TOD site plan guidelines:

   - Orient buildings toward the street with short setbacks and parking behind or on the side of buildings (see Figure 19-13)
   - Cluster buildings along the street within convenient walking distance of one another
   - Design pedestrian-oriented buildings by ensuring that ground floor space faces the street, street-level retail is included in appropriate areas, structures are built to lot lines, and building fronts are made permeable by the placement of windows and doors
   - Encourage mixed use among and within buildings (see Figure 19-14)



TRANSIT DISTRICTS

POTENTIAL BUS ROUTES (AS DEVELOPMENT OCCURS)

EXISTING BUS ROUTES

Figure 19-12

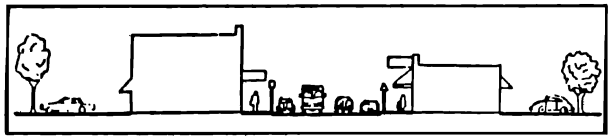
Primary Corridors and Districts for Transit-Oriented Development

0 2000 4000 8000 feet NORTH

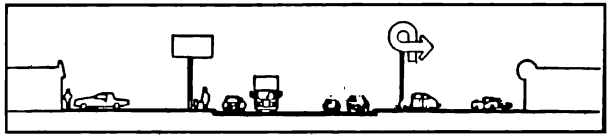
transit_corridor_fig20-3.apr

- Eliminate minimum parking requirements that result in dedicating large areas of surface parking. Promote shared parking agreements between uses that require parking at different times of the day and days of the week (e.g. office and entertainment uses)
- Provide streets with wider sidewalks (e.g. 8 to 12 feet minimums), street trees, pedestrian-scale lighting fixtures, planters, pedestrian-scale signage, and street furniture
- Buffer sidewalks from parking lots with landscaping, fencing, etc.
- Create transit bays within street right-of-way and transit shelters placed in high activity locations.

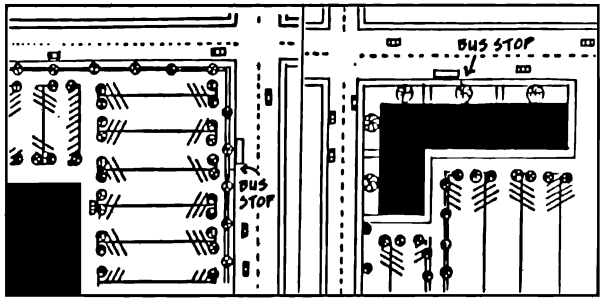
Figure 19-13: TOD Design. Orient buildings toward the street to reduce distances for pedestrians, bicyclists, and transit users while still accommodating automobiles.



Pedestrian & Transit-oriented Development



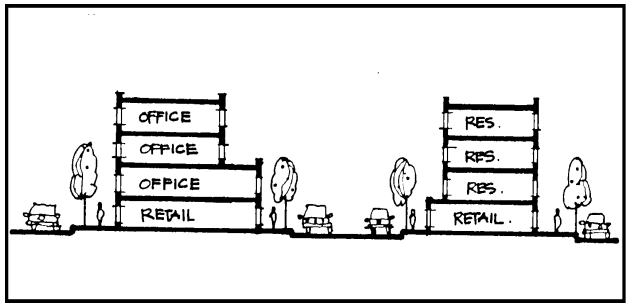
Automobile Oriented Development



Undesirable
Buildings separated from street by parking

Desirable
Parking behind building

Figure 19-14: TOD Design. Mix land uses within buildings



Photographs of Transit Oriented Development examples are included below and on page 18-28 of the land use plan.

Example of Mixed Use Building in TOD

Roadway System

The primary transportation mode in Green Bay is the private automobile operating on the public roadway system that defines development blocks in existing and new growth areas. Therefore actions recommended in regard to the roadway system are the most prominent and influential components of the overall transportation plan.

Objective 4 – Thoroughfare System

Work with WisDOT, Brown County, and the MPO to maintain a thoroughfare system that ensures safe and efficient movement of people and goods, efficient and cost-effective use of public resources, minimal negative impacts to adjacent land uses and the community, and consistent, predictable and comfortable driving environments.

Recommended Policies:

1. **Update Functional Classification System:** The City of Green Bay will work with WisDOT, Brown County, and the MPO during the planned review and update of the functional classification system. The functional classification system should follow an orderly pattern with appropriate spacing, access controls, traffic capacity, speeds, and pedestrian, transit and bike facilities. Table 19-1 provides general characteristic guidelines for functionally classified roadways. Figure 19-15 illustrates existing and proposed functional classified roadways for the City of Green Bay as determined by land use development.

   Proposed future minor arterial roadway designations include:

   - Eaton Road between I-43 and Town of Bellevue east city boundary. Eaton Road is in Bellevue but would serve the southeast corner of Green Bay.
   - Northview Road between Eaton Road and Sturgeon Bay Road (STH 54/57).

   Proposed future collector roadway designations include:

   - Van Lanen Road between Nicolet Drive and STH 57
   - Church Road between Nicolet Drive and STH 57 (Direct access from Church Road to STH 57 may be eliminated in the future as the result of STH 57 upgrades)
   - Erie Road between Greenbrier Road and Whittier Street
   - Grandview Road between Greenbrier Road and Sturgeon Bay Road.

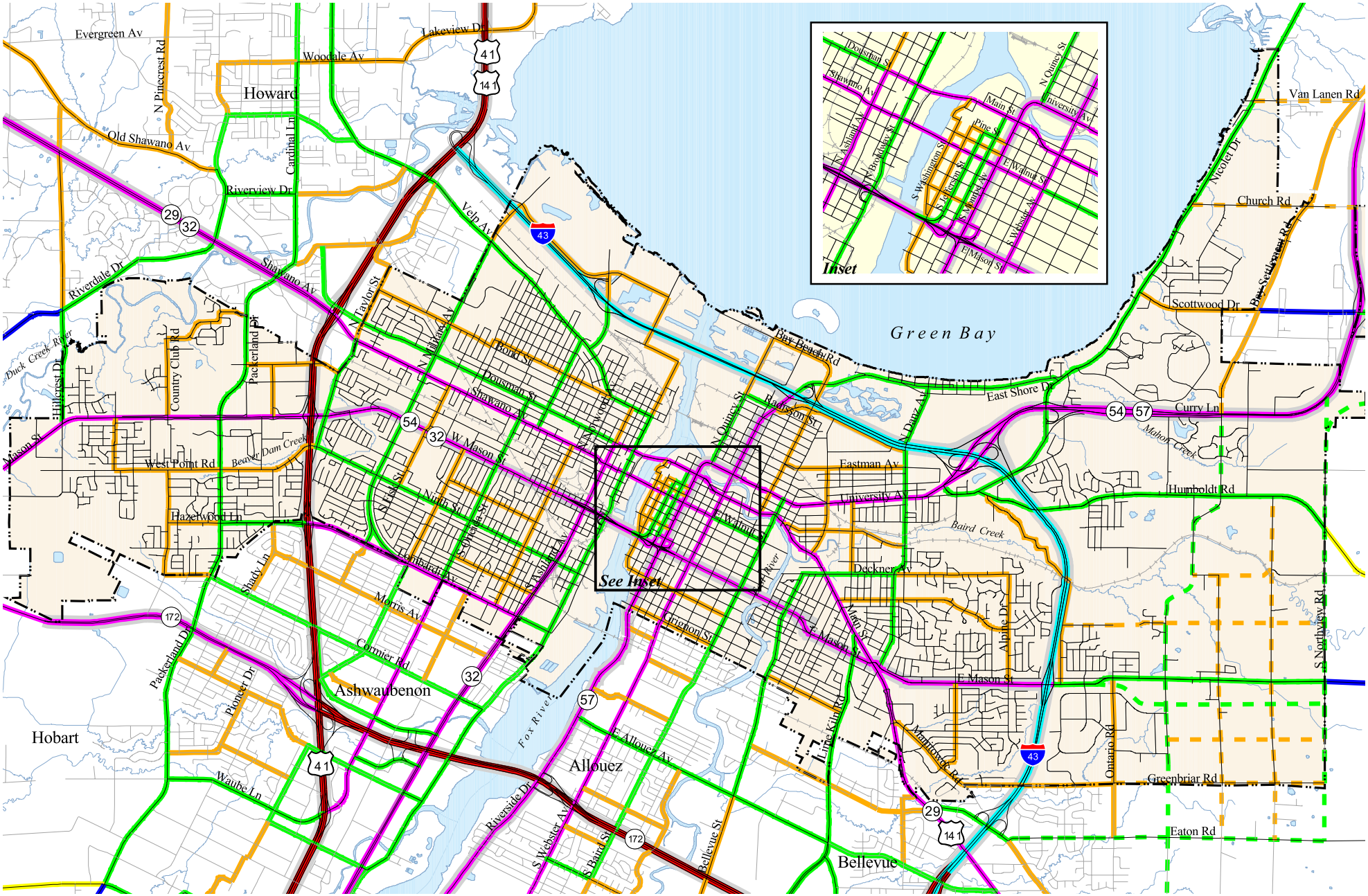
2. **New Arterial and Collector Streets:** The City will plan for the appropriate provision of functionally classified roadways to serve future development as identified in the Land Use Plan. Proposed general roadway alignments and classifications to serve these new growth areas are shown on Figure 19-16.

   Proposed new minor arterial roadways include:

   - East Mason Street new alignment between Ontario Road and Northview Road, extending into the Town of Humboldt.
   - "Eastern Arterial" (Huron Road) between the town of Bellevue and Bay Settlement Road (STH 54/57).

   Proposed new collector roadways include:

   - Sitka Street between Superior Road and Northview Road
   - Whittier Street between Eastern Arterial and Grandview Road
   - Padi-wood Street between Huron Road and Northview Road
   - Greenbrier Road between Ontario Road and Northview Road.



functional_class.apr

INTERSTATE
FREEWAY
PRINCIPAL ARTERIAL
MINOR ARTERIAL
FUTURE MINOR ARTERIAL
COLLECTOR
FUTURE COLLECTOR
MAJOR COLLECTOR
FUTURE MAJOR COLLECTOR
MINOR COLLECTOR
LOCAL
NHS

Figure 19-15

Proposed Functional Class and National Highway System (NHS)

0 2000 4000 8000 feet

NORTH

Table 19-1: General Roadway Characteristics by Functional Classification

	Definition/Purpose	Traffic Flow/Access Priority	Facility Spacing	Trip Length	Traffic Volume	Traffic Speed	Pedestrian Provisions	Bicycle Provisions	Fixed Route Transit Provisions	
Freeway	Full access control with continuous traffic flow separated in grade from other facilities. Intended for high-volume high-speed traffic movement between cities and across the metropolitan area. No direct access is provided to adjacent land.	*Traffic Flow/Access Priority 99/1* Access by grade-separated interchanges at 1-3 mile intervals.	4-8 Miles	Between cities and across metropolitan area (2 or more miles).	20,000-100,000 vehicles per day.	Running: 55-70 mph Average: 55-60 mph.	Pedestrians Prohibited.	Bicycles Prohibited.	No stops, express routes only.	Freeway
Expressway	Partial access control and high priority for traffic flow with at-grade signalized intersections for major streets. Intended for high-volume moderate-to-high speed traffic movement across the metropolitan area with minimal access to adjacent land. *May be designed as a highway with separation from adjacent land uses or as a street with controlled access to adjacent land uses.*	*Traffic Flow/Access Priority 80/20* At-grade intersections with arterial and collector streets. Signals are uniformly spaced for optimum traffic flow. Driveway and street intersections designed for maximum of 10 mph speed decrease in through-lane for turning vehicle.	3-5 Miles	Across metropolitan area and between major activity centers (2 or more miles).	20,000-50,000 vehicles per day.	Running: 40-55 mph Average: 30-40 mph.	Highways: Pedestrians discouraged. Streets: Walkways required on both sides.	Highways: None. Streets: Separate path striped lane.	Highways: No stops, express routes only. Streets: Turnouts at major generators.	Expressway
Principal Arterial	Provides for high to moderate-volume moderate-speed traffic movement between and through major activity centers. Access to abutting property is subordinate to traffic flow and is subject to necessary control of entrances and exits.	*Traffic Flow/Access Priority 60/40* 270' spacing for accesses and additional control as required for traffic flow. Safety and traffic flow are balanced in determining signal spacing.	1-2 Miles	Between and through major activity centers (2-8 miles).	10,000-30,000 vehicles per day.	Running: 30-40 mph Average: 25-30 mph.	Walkways required on both sides.	Paved shoulders 6'. Shared outside lanes. Striped lanes 5'.	Scheduled stops every 1/4 mile.	Primary Arterial
Minor Arterial	Augments and feeds the primary arterial system and is intended for moderate-volume moderate-speed traffic movement. Access to abutting property is partially controlled.	*Traffic Flow/Access Priority 45/55* 210' spacing for accesses. Safety is higher priority than traffic flow in determining signal spacing.	1/2-1 Mile	Between and within activity centers (1-4 miles).	6,000-20,000 vehicles per day.	Running: 25-35 mph Average: 20-25 mph.	Walkways required on both sides.	Shared outside lanes. Striped lanes.	Scheduled stops every 1/4 mile.	Secondary Arterial
Collector	Collects and distributes traffic between arterial streets and local streets. Intended for short length trips while also providing access to abutting properties. *Design of collector streets varies depending on the character and intensity of traffic generated by adjacent land development.*	*Traffic Flow/Access Priority 30/70* 160' spacing for non-residential accesses.	1/4-1/2 Mile	Local street to arterial street (1/2-2 miles).	1,500-8,000 vehicles per day.	Running: 20-30 mph Average: 15-20 mph.	Walkways required on both sides.	Shared outside lanes. Striped lanes.	Scheduled service and paratransit.	Collector
Local	Provides direct access to abutting property. Intended for low-speed low-volume traffic movement and for short length trips. *Design of local streets varies depending on the character and intensity of traffic generated by adjacent land development.*	*Traffic Flow/Access Priority 10/90* No restrictions. 40' between accesses	As required	Access to individual property parcels (Less than 1/2 mile).	Commercial less than 1,000 residential vehicles per day.	Running: 20-25 mph Average: 10-15 mph.	Walkways on one or both sides	Shared outside lanes.	Scheduled service if no viable collector access.	Local

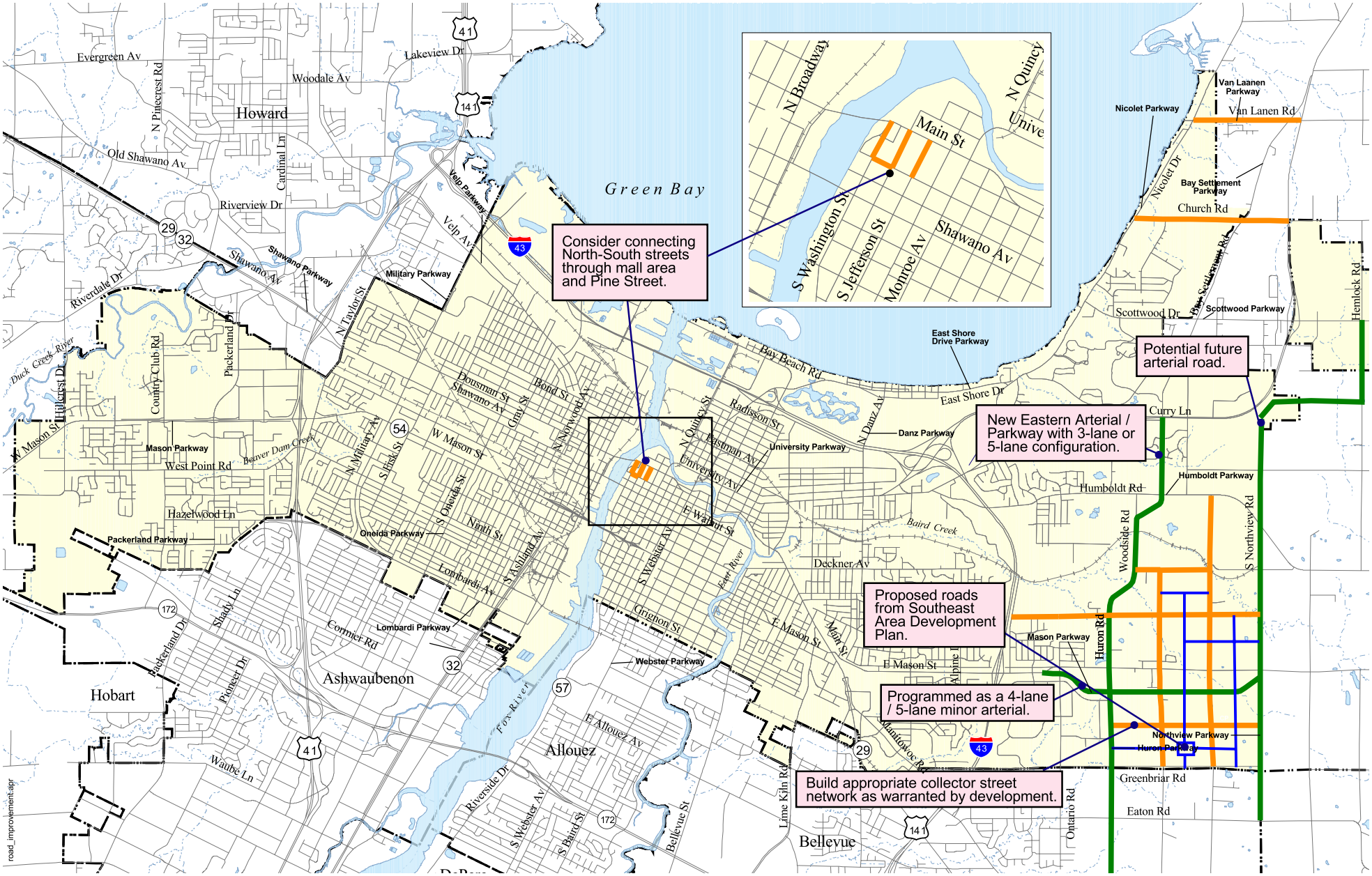


Figure 19-16

Proposed New Roadways

WisDOT is converting State Trunk Highway 57 from I-43 to Sturgeon Bay to an expressway by2008. Long range improvements being considered include upgrading STH 29 west of US 41 and part of STH 172 west of US 41 to freeways.

A detailed needs assessment should be prepared in response to development proposals prior to finalizing roadway recommendations. Some new roadways have been identified and adopted in the proposed southeast site area development plan (see Figure 19-16). To be identified as officially designated roadways, all proposed new roadways should be identified and adopted in Area Development Plans (ADP) .

3. **Jurisdictional Transfers:** The City will continue to work with WisDOT and Brown County to implement the remaining recommendations identified in the *Jurisdictional Transfer Study for Brown County* (see Figure 19-17). Jurisdictional transfers yet to be implemented include:

   - Hazelwood Lane (CTH VK) from Packerland Drive (CTH EB) to US 41. Transfer from Brown County to City of Green Bay and Village of Ashwaubenon
   - Eastern Arterial from STH 54/57 to I-43. Add to County Trunk Highway System when built
   - Lime Kiln Road (CTH V) from south of Debra Lane to Verlin Road. Transfer from Brown County to City of Green Bay
   - Humbolt Road (CTH N) from 910 feet east of Bascom Way to the proposed Eastern Arterial. Transfer from Brown County to City of Green Bay
   - Finger Road (CTH V) from Ontario Road to proposed Eastern Arterial. Transfer from Brown County to City of Green Bay

   Future jurisdictional transfers should follow the existing jurisdictional transfer guidelines prepared by WisDOT.

In general, roads that solely serve local transportation needs will be owned and maintained by the City of Green Bay. Roads that serve regional or statewide transportation needs will be owned and maintained by the County or State. Jurisdictional assignments should be based on several factors including:

- Length of road
- Length of trips served
- Connections to roads of similar jurisdictions
- Average daily traffic
- Functional classification
- Special facilities served

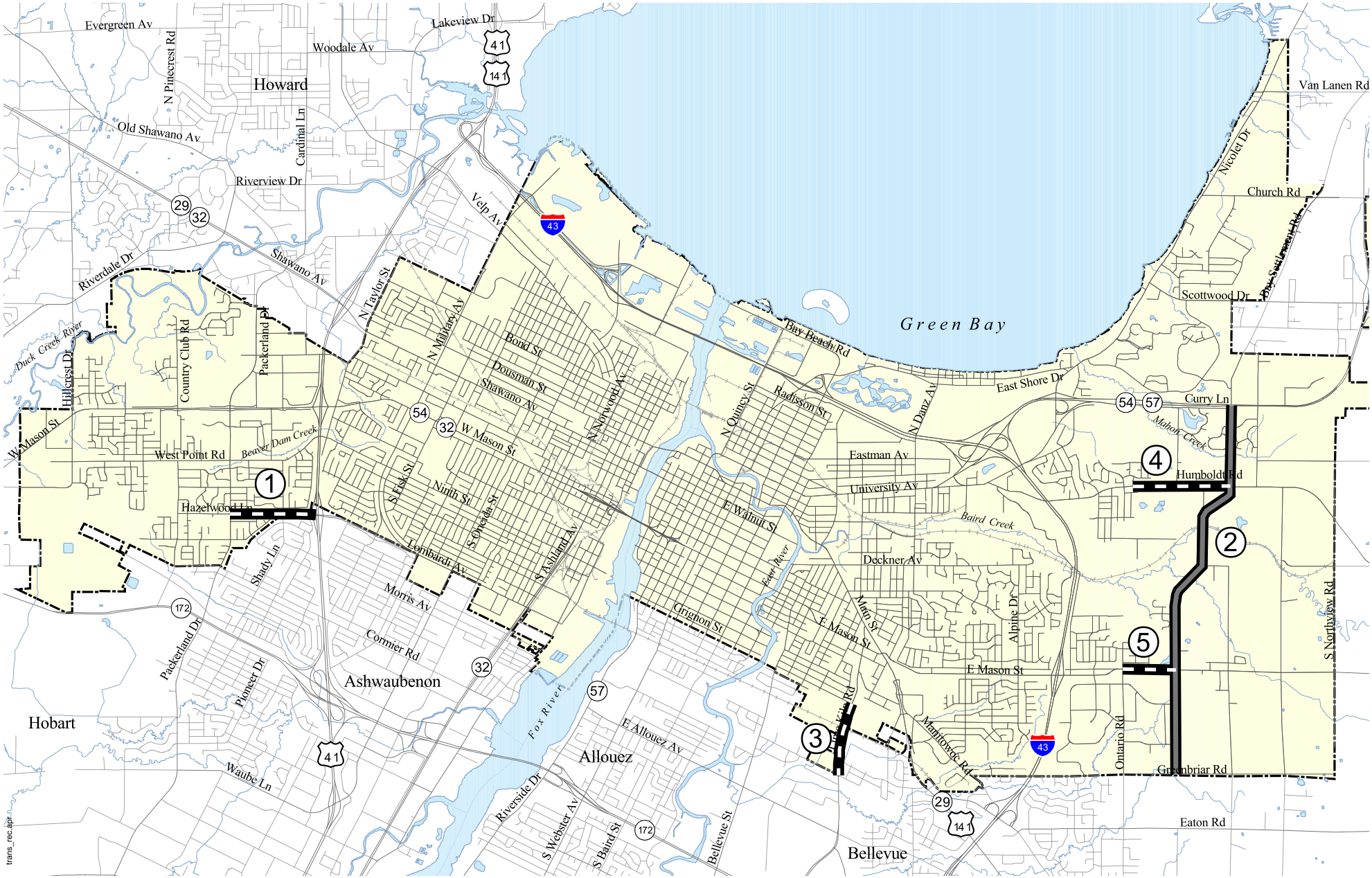
Objective 5 – Traffic Forecasting and Management

Mitigate traffic congestion when and where necessary to maintain traffic flow and minimize travel delays with a balanced approach that respects community values.

Recommended Policies:

1. **Travel Demand Forecasting:** The City will work with the Brown County MPO to update the travel demand model with current census data when available. The model update should consider refinements to the model to account for mixed land uses and alternative transportation mode improvements (refer to travel demand modeling process in Appendix A).

2. **Capacity:** Capacity expansion is only one mitigation measure available to the City and will be used only after consideration of alternatives. Increasing capacity by building more lanes or widening roadways may be counter productive to other City objectives (e.g. encouraging redevelopment of neighborhoods or creating more pedestrian, bicycle, and transit friendly neighborhoods).



TRANSFER FROM BROWN COUNTY TO CITY OF GREEN BAY

ADD TO BROWN COUNTY TRUNK HIGHWAY SYSTEM UPON COMPLETION

1. HAZELWOOD LANE
2. PLANNED EASTERN ARTERIAL (I.E. HURON ROAD)
3. LIME KILN ROAD
4. HUMBOLT ROAD
5. FINGER ROAD

Figure 19-17

Roadway Jurisdictional Transfer Recommendations

0 2000 4000 8000 feet

NORTH

3. **Transportation System Management:** Utilize transportation system management strategies on arterial roadways to improve traffic flow, maximize capacity, and increase overall system efficiency and safety. Transportation system management strategies include:

   - Advanced traffic signal control systems: Traffic signal upgrades and timing adjustments are a cost-effective means or improving and optimizing traffic flow. Traffic signal timing should be a routine, ongoing activity involving a regular review of timing plans in light of actual traffic volumes and patterns
   - Intelligent transportation systems: WisDOT's District 3 developed the Oshkosh/Fox Cities/Green Bay ITS Strategic Deployment Plan, which was completed in May, 2001. The plan identifies a wide variety of Intelligent Transportation System (ITS) technologies for addressing numerous transportation-related problems in the Green Bay area.
   - Intersection improvements: Intersection improvements, such as roundabouts, increase capacity and safety when used at appropriate locations.

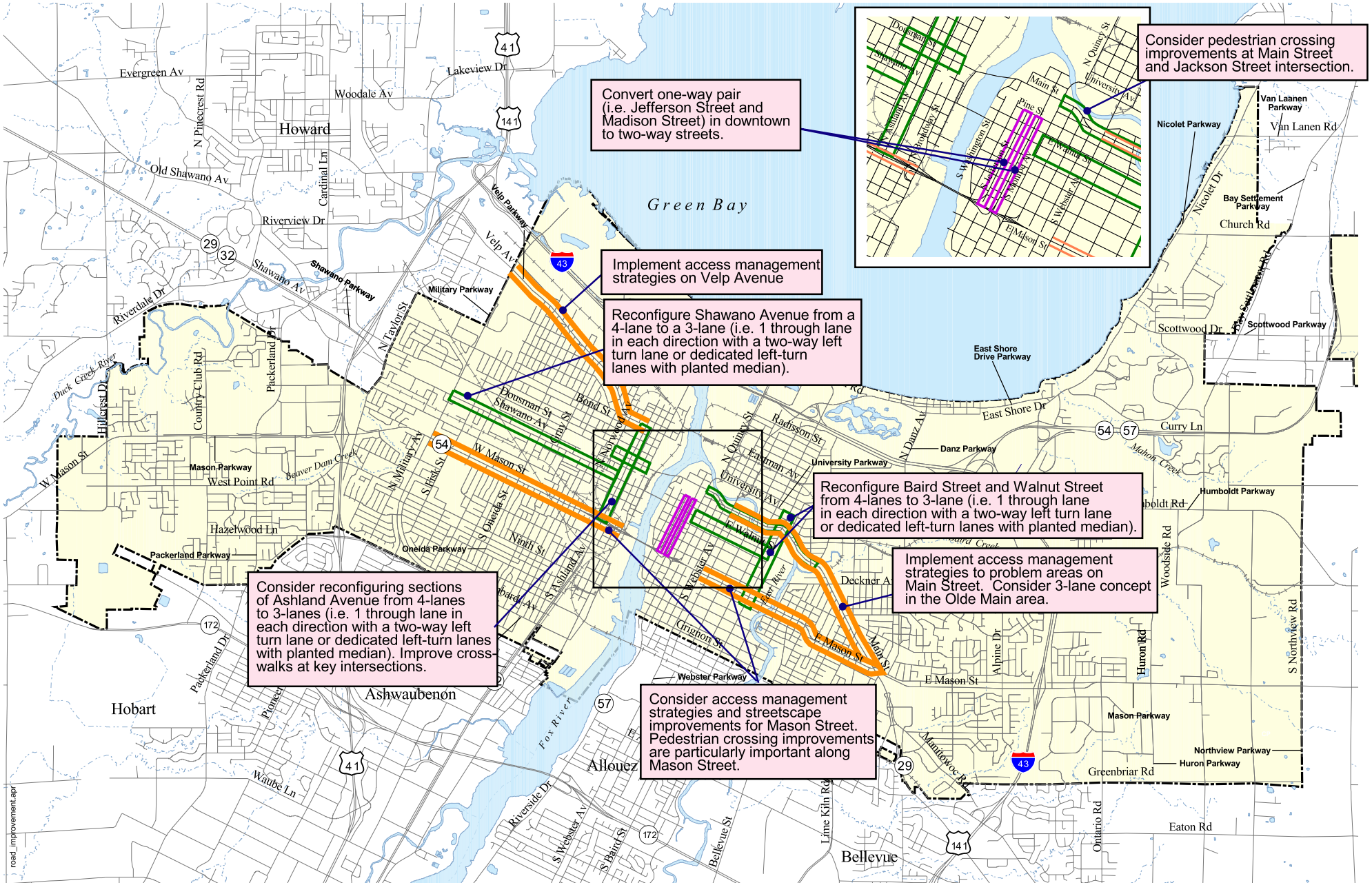
   Roundabouts have been used in other cities in the area and have been shown to be a cost-efficient measure for safely increasing intersection capacity while improving pedestrian and bicycle environments and creating a more attractive streetscape.

4. **Access Management:** Develop and implement access management plans for principal and minor arterial corridors. Access management strategies should be integrated with the parkway concepts identified in the urban design plan and include:

   - Combining driveways
   - Moving driveways away from intersections
   - Take advantage of cross streets to provide access points
   - Control left turning movements and provide pedestrian refuge by creating raised medians. Planted medians with trees will discourage speeding and create a more interesting and attractive environment. Raised medians are preferable to continuous two way left turn lanes since they create wide expanses of concrete, which encourage higher speeds.
   - Access management strategies should provide for pedestrians, bicycles, and transit use.

Access management with a planted median in a residential area.

Figure 19-18 identifies arterial corridors that would benefit from access management strategies. However, access management should be a consideration when redesigning all arterial roadways.



1-Way to 2-Way Street

4-Lane to 3-Lane

Improved Access Management Streets

road_improvement.apr

Figure 19-18

Proposed Roadway Improvements

0 2000 4000 8000 feet

NORTH

5. **Excess Capacity:** In some cases, the City should consider removing capacity (i.e. travel lanes) where not warranted by existing and forecasted daily traffic or to mitigate the negative impacts of a wide road (e.g. excessive speeding, pedestrian barriers, undesirable streetscapes).

6. **Four-Lane to Three-Lane Roads:** The City should consider converting four-lane undivided roadways to three-lane configurations with one through lane in each direction and a two-way left-turning lane (Figure 19-19) or dedicated left-turn lanes at intersections. Dedicated left-turn lanes with planted medians is preferable for encouraging slower speeds, creating attractive streetscapes and providing a better pedestrian environment (see Figure 19-20). However, a center two-way left-turn lane may be needed along segments with many driveways.

   Converting four-lane undivided roads to three-lane configurations has been shown to improve traffic flow, reduce speeding, increase safety, and provide a safer and more comfortable environment for pedestrians and bicyclists. These conversions are appropriate in areas with high left-turning movements and where speeding and safety concerns are a problem. Depending on how prevalent left turns are, the capacity difference between a three-lane configuration and a four-lane undivided road is minimal.

   Converting a four-lane to a three lane is appropriate for roadways with less than 15,000 AADT (i.e. peak hour volumes less than 1,500 vehicles per hour) and can potentially be used on roads as high as 17,500 AADT (i.e. peak hour volumes between 1,500 and 1,750 vehicles per hour).
   Figure 19-18 illustrates locations of possible four-lane to three-lane conversions. However further study is required to assess peak hour volumes, turning movements, safety concerns, and related issues prior to implementation. Candidates for conversion to a three-lane configuration include:

   - Shawano Avenue between Ashland Avenue and Military Avenue
   - Baird Street between Mason Street and University Avenue
   - Walnut Street Between Monroe Street and Baird Street
   - Ashland Avenue between Mather Street and Mason Street

   Shawano Avenue, Baird Street and Walnut Street have existing and forecasted traffic volumes that are within the range appropriate for a three lane configuration. These corridors generally run through residential areas. Shawano Avenue and Baird Street also have several schools along or near the street.

   The "Olde Main" district would be more attractive to shoppers by converting Main Street in this area to a three lane concept.

Figure 19-19: Three-Lane Road

Example of a four-lane undivided road that has been re-striped to a three-lane configuration (i.e. one lane in each direction with a center left turning lane and parking lanes and bicycle lanes).

Figure 19-20: Three-Lane Road with Planted Median

Example of a three lane configuration with one lane in each direction, dedicated left turn lanes and planted medians.

On street parking could be increased, traffic slowed and the pedestrian environment improved. Current and forecasted traffic volumes are within the range acceptable for a three-lane concept.

7. **Convert One-Way Pair to Two-Way Streets:** The Jefferson Street / Madison Street one-way pair range in average annual daily traffic counts of 3,500 to 4,880 and 3,300 to 6,100, respectively. These traffic counts suggest that one-way street capacities are not needed. Furthermore, results from the Brown County intersection crash study suggest that the one-way configurations may contribute to high crash rates at several intersections along these roads. Converting these streets to two-way streets will reduce traffic speeds and speed variability making the street safer and more comfortable for pedestrians, bicyclists, and on-street parking.

8. **Parkway Design:** Create parkway designs for major arterial streets (see Figure 20-1). Collector streets/parkways will be constructed with lane space allocated for each direction of traffic as shown below. Lane widths are kept to a minimum to keep speeds to an appropriate level for a residential neighborhood. Street trees provide a barrier between moving traffic and pedestrians, narrow sight lines to calm traffic and create an appealing streetscape.

   A parkway effect can be created by converting existing raised concrete covered medians to planted medians, preferably with large tree species that will narrow site distance to encourage slower yet consistent speeds. Most major corridors have existing concrete medians that could be converted to planed medians. The City should identify and prioritize concrete medians to be converted to planted medians.

   Arterial parkways are recommended to be designed with the following dimensions (see Figure 19-21 and Figure 19-22). All proposed street widths are compatible with AASHTO guidelines (see Table 19-2). Figure 19-23 illustrates the recommended collector street design. Where streets are designated as part of the National Highway System (NHS) or a truck route, 12-foot lane widths are required in place of 11-foot lane widths.

Figure 19-21: Recommended Retrofit Urban Arterial Parkway Design

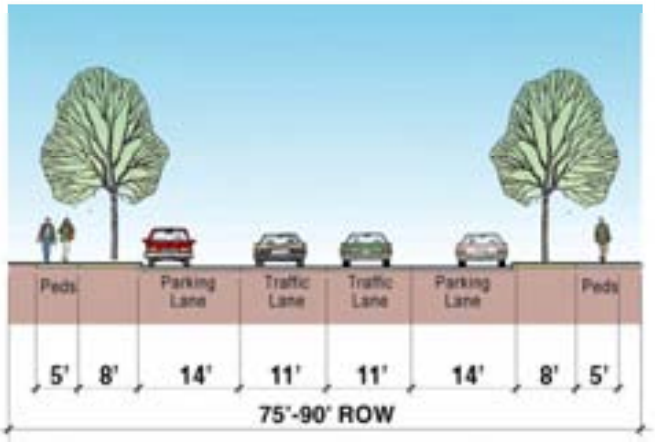


Figure 19-22: Recommended New Urban Arterial Parkway Design

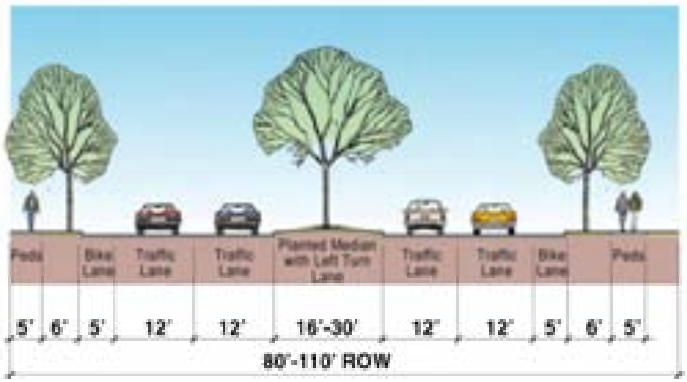


Figure 19-23: Recommended Major Collector Street Design

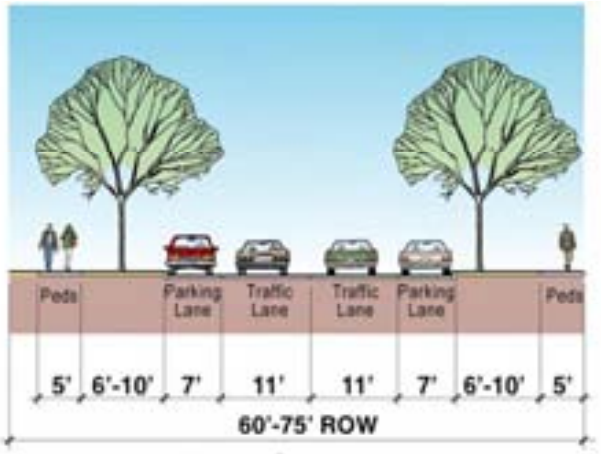


Table 19-2: AASHTO Minimum Street Design Guideline Summary

	Local	Collector	Arterial
Design Speed	20-30 mph	30 mph	37 - 62 mph
Through-Lanes	1 to 2	2	2 or >
Lane Width	10-12 ft	10-12 ft	10-12 ft
Parking Lane Width	7 ft	7-10 ft	10-12 ft
Curb Width	1-2 ft	1-2 ft	1-2 ft

Source: American Association of State Highway Transportation Officials (AASHTO)

9. **Neighborhood Impacts:** Capacity improvements, when and where determined necessary, should be designed to minimize negative impacts to neighborhoods including: planting buffers with street trees; designs for appropriate speeds; and possibly roundabouts in place of traffic signals where appropriate.

10. **Interagency Coordination:** Brown County and WisDOT need to be involved in proposed road improvements and parkway development for roads within their jurisdictions. It is important for Brown County and WisDOT to be consulted on projects involving reductions in capacity and/or levels of service that may impact roadways under their jurisdiction.

Objective 6 – Neighborhood Streets

Design neighborhood streets with facilities for automobile, bicycle, and pedestrian travel while limiting the impacts of traffic.

Recommended Policies:

1. **Local Street Design:** The design of new local streets should provide for traffic movement while ensuring a safe, attractive, and pedestrian and bicycle friendly neighborhood environment. The following street design provides 30-feet from back of curb to back of curb and allows for two-side parking and two-way traffic. (See Figures 19-24a and 19-24b.)

Figure 19-24a: Recommended Local Residential Street Design with Parking on Both Sides

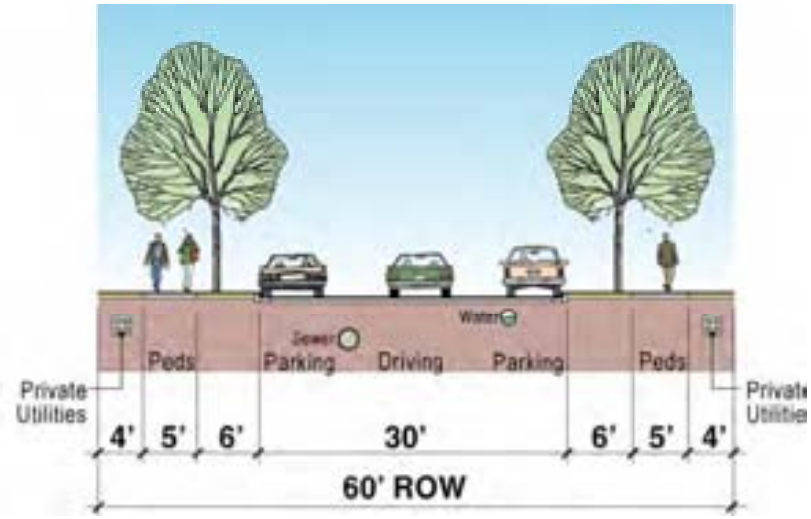
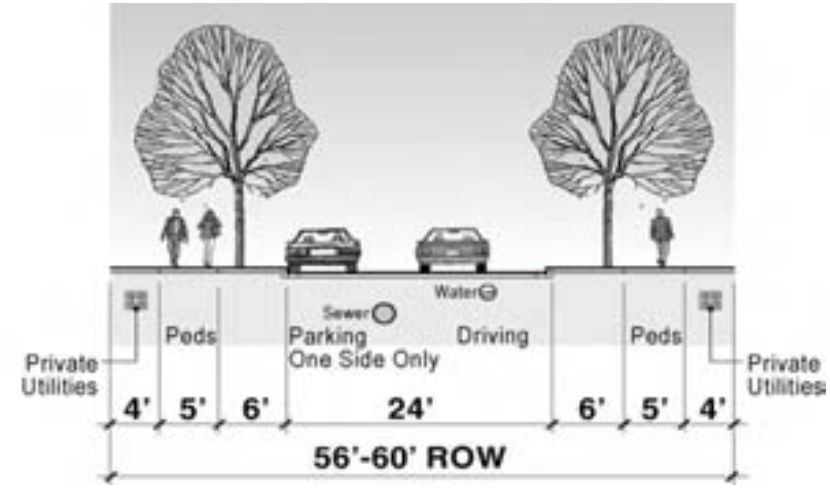


Figure 19-24b: Alternative Local Residential Street Design with Parking on One Side Only



A 30-foot road width would allow seven-feet of parking width on each side of the road leaving 16-feet of shared through-lane for traffic. Where cars are parked across from each other, on-coming vehicles will have to slow down to pass or one car will pull into the parking lane while the other car passes. In new development where substantial off-street parking is provided, the need to slow for on-coming traffic will be minimal.

Unlike arterial and collector streets that allocate space for each directional lane of traffic, local streets, which have very low traffic counts, can operate with a shared through-lane that accommodates both directions of traffic

Table 19-3 lists design options for new residential streets. New cul-de-sacs should be allowed where topography or planned greenways limit access to properties, or when mutually agreed to by the developer and the City of Green Bay. Table 19-3 includes a minor collector street is listed as an alternative to the local street design where proposed neighborhood development is anticipated to produce more than 1,000 vehicles per day on a local street and/or have high on-street parking demand.

New streets should integrate traffic calming designs, particularly where the demand for on street parking is light. If on-street parking demand is low, the recommended street width will not have much of a traffic calming effect. Using traffic calming designs such as neckdowns at intersections and/or mid-block parking bays will help slow traffic while still providing on-street parking on both sides of the street.

While the recommended local street design calls for new local streets to be designed for a 30-foot width with two-side parking, narrower streets have been used in many cities to successfully accommodate local traffic movements, parking demand, snow issues, and emergency vehicle and maintenance vehicle access.

Narrow streets have been shown to reduce traffic speeds, creating a quieter, safer, and more comfortable pedestrian and

Table 19-3: Characteristics of New Residential Streets

Type of Street	Street Width *	Right-of-Way Width	Traffic Direction	Parking	Planting Strip	Sidewalk	Utilities
Loop around a green (fewer than 6 houses)	20	44	One way	One side	6 with trees	2 @ 5	Easement behind the sidewalk for electricity, telephone, cable TV. Sewer and water under the street.
Cul-de-sac (fewer than 8 houses)	24	48	Two ways	One side	6 with trees	2 @ 5	
Cul-de-sac (8 or more houses)	28	52	Two ways	Both sides	6 with trees	2 @ 5	
Local	24	48	Two ways	One side	6 with trees	2 @ 5	
Local	30	60	Two ways	Both sides	6 with trees	2 @ 5	
Collector (Minor)	32	60	Two ways	Both sides	8 with trees	2 @ 8-10	
Collector (Major)	36	72	Two ways	Both sides	8 with trees	2 @ 8-10	

* All dimensions are in feet to the back of the curb.

bike friendly environment. Narrow streets benefit developers by reducing costs and benefit the City by reducing maintenance, snow removal and reconstruction costs. On streets with one-side parking, weekly alternative-side parking can accommodate street cleaning and snow removal. Narrow streets can create challenges for emergency and maintenance vehicles, although many cities have been able to successfully address these challenges.

2. **ADA Compliant Streets:** All streets should meet established guidelines required by the Americans with Disabilities Act (ADA). Costs associated with creating ADA compliant streets during construction is minimal. A plan and budget should be in place for retrofitting existing streets with appropriate pedestrian ramps and related facilities.

3. **Traffic Calming:** Utilize appropriate traffic calming strategies on local streets and other streets where deemed appropriate. Measures may need to be taken to calm traffic in areas where excessive speeding is a problem, particularly where pedestrians are especially vulnerable, such as near schools and parks. A wide variety of traffic calming strategies are available as previously discussed.

4. **Traffic Calming Program:** Institute a public/neighborhood initiated process for addressing traffic calming needs.

   A traffic calming program would provide residents with a process to work with neighbors toward addressing negative traffic impacts in their neighborhoods.

Example of traffic calming strategy (i.e. intersection neck-downs), which reduces pedestrian crossing distance and slows traffic by narrowing site lines. This design is particularly appropriate in high pedestrian areas such as near schools or parks.

Gaps in the sidewalk network should be filled to create a seamless and comfortable pedestrian system that provides connections throughout the community.

Pedestrian System

Walking accounted for 4.4 percent of commuter trips in 1990, which was higher than transit or bicycle use. Virtually all trips begin and end with a walking trip, yet over the last 50 years walking as a form of transportation has generally been ignored.

Pedestrian issues should not be underestimated or undervalued. Similar to the roadway network, pedestrian facilities need to be viewed as a system providing for seamless and comfortable pedestrian movements throughout the community. For example, subdivision sidewalk requirements will have only limited value if sidewalks end abruptly at the subdivision boundary or at the first major roadway.

Implementing of the land use plan's smart growth policies in conjunction with the transportation and urban design plan street design recommendations will be essential in creating a more pedestrian friendly and walkable Green Bay.

The following objective and policies are consistent with and complimentary to the vision, goals and objective identified in the Wisconsin Department of Transportation's *Wisconsin Pedestrian Policy Plan 2020.* The City should continue to work closely with WisDOT to ensure that pedestrian issues, particularly those affecting children, the elderly, and the disabled, are addressed along and across state trunk highways within Green Bay.

Objective 7 – Pedestrian Environment

Create a seamless pedestrian system and a more walkable community.

Recommended Policies:

1. **Pedestrian Corridors:** Sidewalks or other pedestrian corridors shall be provided on all new streets and in all new subdivisions. This can be accomplished by one of the following alternatives as mutually agreed to by the developer and the City Council:

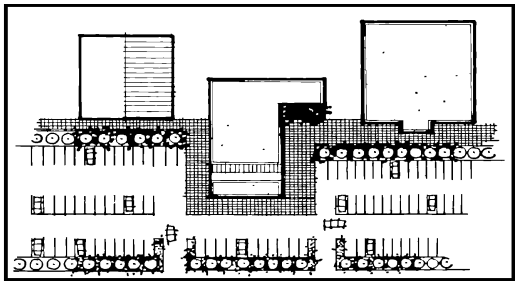
   - Sidewalks on both sides of all new streets
   - A sidewalk on one side of the street
   - A pedestrian trail system within a subdivision, such as a conservation by design subdivision, that is open to the public and connects at two ends to a public sidewalk or trail when available.
   - Streets striped as a visually narrowed roadway.
   - Other Best Management Practices that may arise in the future.

   Sidewalks will not be required on cul-de-sacs and circle streets provided a pedestrian connection easement is made available from the cul-de-sac or circle street to a public sidewalk or trail. In addition, sidewalks would not be needed on single-loaded streets (those with housing on only one side).

   Sidewalk connections and crosswalks at major intersections should be completed in coordination with new development. Sidewalks should be a minimum of five feet wide in residential areas and wider in commercial areas, where an eight to ten-foot walking corridor from street curb to building face is recommended by WisDOT.

The City should ensure that sidewalks are provided and maintained along all major streets. New and reconstructed streets should include the provision of sidewalks at City expense, if need be. The street system is more than the domain for automobiles, and therefore, road-funding policies should reflect the needs of all street users.

Figure 19-25: Pedestrian Connections



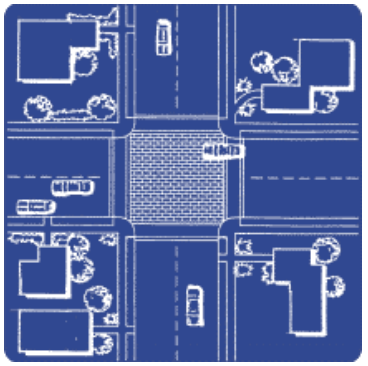
Sidewalks and pedestrian connections between buildings and through parking lots should be provided in new developments.

2. **Pedestrian Crossings:** At a minimum, pedestrian crossings should comply with the Americans with Disabilities Act (ADA) by providing appropriately designed pedestrian ramps. Pedestrian crossing design should be a priority in the design and construction or reconstruction of functionally classified roadways.

   Several principal arterial streets have fast moving traffic with multiple through-lanes that are difficult for pedestrians to cross (e.g. Mason Street, North Military Avenue, University Avenue, and Main Street east of Monroe Street). Pedestrian crossing improvements on major roadways near schools, parks and other high pedestrian activity areas should be a high priority. Figure 19-26 illustrates two examples of intersection designs that enhance the pedestrian environment at intersections. These and other traffic calming devises slow auto traffic and increase driver awareness of pedestrians and improve pedestrian safety and comfort.

Figure 19-26: Intersection Pedestrian Crossings.

Neckdowns are curb extensions at intersections that reduce roadway width curb-to-curb.



Raised intersections are flat raised areas covering entire intersections, with ramps on all approaches and often with brick or other textured materials on the flat section.

3. **Sidewalk System Plan:** The City should develop a plan that identifies and ranks in priority sidewalk and pedestrian needs (e.g. pedestrian ramps, crosswalks, etc.). The plan should include an implementation process and program for funding pedestrian improvements in existing neighborhoods and developments. Sidewalk funding sources should be consistent with roadway funding. Improvements should be ranked according to pedestrian benefits, safety, access to schools, parks and other major pedestrian generators.

   Currently, sidewalk construction is assessed to property owners. However, the City does not have a funding source for sidewalks along streets with reverse frontage or no adjacent property

owner. These tend to be arterial streets and are particularly important for providing pedestrian system connectivity. The City should evaluate current sidewalk funding mechanisms and ensure that sidewalks are provided along all major roadways.

Roadways serve many users and uses and should not be relegated as an automobile exclusive environment. Roadway funding mechanisms need to reflect a multi-modal approach to transportation infrastructure.

4. **Multi-Jurisdictional Cooperation:** The City should work with WisDOT and Brown County to identify and correct pedestrian barriers related to State trunk highways and County roads in the City and encourage the inclusion of pedestrian facilities as part of construction projects (e.g. interchange of Mason Street and US 41). The City should work with and encourage WisDOT to fund stand-alone sidewalk retrofit projects under the regular 3R program as described in the WisDOT Pedestrian Plan.

5. **Urban Design:** Sidewalks by themselves will not induce walking. More important are an appropriate mix of land uses and densities, the quality and design of the built environment, pedestrian-scale streetscapes, and pedestrian comfort. The City should work to create pedestrian-oriented environments by implementing this Plan's land use and urban design recommendations.

   Creating pedestrian environments between buildings even in auto-oriented commercial areas can encourage more walking between buildings. At a minimum, sidewalks or pedestrian areas should provide connections between buildings within developments (see Figure 19-25). Providing pedestrian amenities (e.g. trees, planters, street furniture, awnings, building windows, etc.) are desirable.

Textured surfaced intersection on Green Bay's Broadway Street is uncomfortable to drive on at high speeds and identifies the area shared with pedestrians.

Sidewalks separated by planting strips and street trees can make even high traffic streets comfortable pedestrian environments.

5. **Traffic Calming:** Utilize appropriate traffic calming strategies in high pedestrian activity areas. Measures may need to be taken to calm traffic in areas where pedestrians are especially vulnerable, such as near schools and parks. A wide variety of traffic calming strategies are available as previously discussed. The sidewalk system plan should identify these areas and recommend appropriate traffic calming strategies where appropriate.

6. **Downtown Pedestrian Connections:** The pedestrian environment is particularly important in downtown, where the scale of development and access to a variety of shops, restaurants, and businesses make walking an attractive alternative. The City should improve the walking environment through downtown, with particular attention over the Fox River on the Main Street and Walnut Street bridges that separate downtown with the Broadway area.

7. **Walkway Maintenance and Snow Removal:** Pedestrian walkways need to be maintained for year-round use. The City should enforce sidewalk snow removal and maintenance ordinances and budget for the maintenance and snow removal of sidewalks under their jurisdiction.

Transit and Paratransit System

Past land use patterns have greatly reduced the ability of public transit to provide viable and cost effective services to its customers. Transit works best when housing is clustered within a convenient and comfortable walking distance of transit stops, and major destinations (i.e. employment, retail, entertainment) are centrally located in a pedestrian-oriented environment with a mix of land uses. The greater the density of activity, the more cost-effective it is for transit to serve. Therefore, the implementation of the land use recommendations will provide the cornerstone for making public transit a viable transportation choice in Green Bay.

In short, the more pedestrian friendly a city is the more transit-viable the city is. The pedestrian system is a critical component to the attractiveness and comfort of using transit. The policies recommended in the pedestrian section are important for improving the viability of providing public transit in Green Bay.

Figure 19-27, shows the generalized employment density for the Green Bay area and current transit route service coverage. The figure was generated using a standard deviation of employment concentrations in order to illustrate employment densities and corresponding transit route coverage. Currently, most employment areas, with a couple minor exceptions, have some degree of transit service. However, the downtown still provides the greatest employment density within a pedestrian-scale environment and thus, the greatest opportunity for attracting choice riders.

Some route restructuring occurred in conjunction with the opening of the Transportation Center in the Spring of 2001. However, the general route structure still follow the City's original streetcar lines. In the past, existing routes have been lengthened to serve expanding development farther from the city core. Many routes cannot extend any further without compromising headway times.

Public transit needs to provide advantages over driving (e.g. time savings, cost savings, or increased convenience) if transit is going to attract non transit dependent riders (i.e., those who don't have access to a car). Because buses currently operate in the mix of traffic, they provide no time benefit for riders trying to avoid traffic congestion. The paradox is that if a higher portion of commuters used transit there would be less congestion. Therefore, bus transit needs to offer other advantages over driving, such as cost savings and convenience.

Objective 8 – Transit

Work with Green Bay Metro to provide transit service, as feasible, throughout Green Bay, and connections to surrounding municipalities and major destinations. Extend routes as feasible to areas of new growth. Establish transit corridors where intensification of development is encouraged to support a viable ridership base.

Recommended Policies:

1. **Land Use:** While improvements to the transit system may be able to help increase ridership somewhat, changes in land use densities, parking policies, the pedestrian environment will likely have a more substantial affect in attracting non-transit dependent riders. The City should implement this plan's land use and urban design recommendations, in particular, the transit-oriented development recommendations, in order to create a more transit viable environment. Key land use recommendations are summarized below:

   - Increase clustered and mixed land uses around and near transit stops.
   - Create interconnected parkways and roads with sidewalks, street trees and pedestrian scale lighting which improve the pedestrian environment.
   - Develop and redevelop activity centers to be accessible by bicycle, walking, transit and automobiles.
   - Adopt and implement transit-oriented-development (TOD) recommendations and site design guidelines outlined on page 19-23 through 19-25.

2. **Provide transit service to future development:** Green Bay Metro should provide transit service to new employment and residential developments. Current transit routes will likely require restructuring in order to effectively serve areas slated for growth east of I-43. Development policies as described in the land use plan will make providing transit service to these areas more viable by creating more clustered and mixed use development. Green Bay Metro should have a voice in how new developments will be served by transit.

   Figure 19-12 on page 19-25 shows potential future transit routes and future TOD development areas that have been identified in the land use plan. Transit hubs/transfer stations should be integrated into TOD areas and activity centers as development/redevelopment occurs.

3. **METRO Transit Route Restructuring Analysis:** City of Green Bay should work with Green Bay Metro in conducting a route assessment that will analysis existing and future route design.

   The route assessment should include a detailed analysis of route efficiency and effectiveness by route segment based on detailed boarding and alighting surveys and an evaluation of transit service markets based on demographic, employment, and land use data.

   It is important to look at routes performance measures by route segments based on demographic, land use, density, and other area characteristics. A single route may serve several different environments with varying performance measure effectiveness results. For example, the segment of a route serving an older neighborhood may have significantly higher ridership than the portion of the route the serve an auto-oriented suburban area. If the entire route was less productive than other routes, there may be a tendency to reduce service on the entire route. Geographic Information Systems (GIS), provide tools that make more complex analyses easier and more affordable.

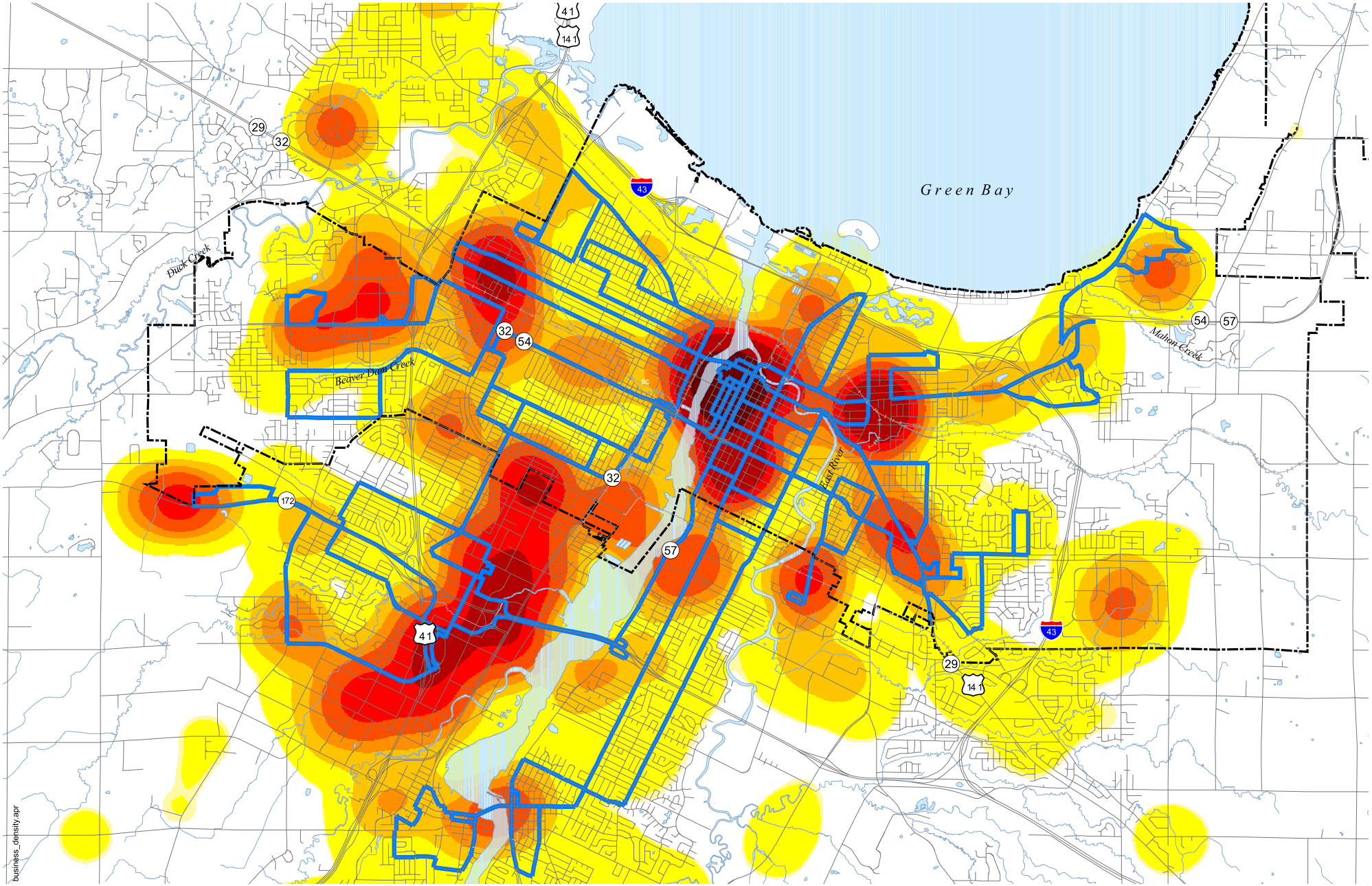


Figure 19-27

Transit Routes and Generalized Employment Density

4. **METRO Transit Long-Range Service Plan** City of Green Bay should work with Green Bay Metro in conducting a long-range transit plan that will propose service recommendations based on route assessment findings and *Smart Growth 2022* land use and transportation recommendations.

   This plan should provide a long-term vision for Green Bay Metro transit service with respect to the comprehensive plan's land use Recommendations. Particular emphasis should be on the designated Transit Oriented Development (TOD) activity centers.

   The plan should develop routing recommendations based on the findings from the route assessment, which may include:

   - Consider using more limited stop/express service in order to provide more time competitive transit service to areas farther out from the city core.
   - Study how best to integrate routes and timed transfers at activity centers.
   - Consider adopting routes that minimize large loops in order to increase competitiveness with auto travel times.
   - Consider using Intelligent Transportation Systems (ITS) technologies that enhance transit information, reliability, security and convenience should be also be considered.

5. **Enhance Transit Services:** The City should work with Green Bay Metro to enhance transit services that attract more choice ridership, particularly among downtown and major industry employees (e.g. hospitals) where parking supplies are limited and/or costly to provide. Transit service improvements to be considered include:

   - Developing more employer oriented transit pass programs that provide free or subsidized transit passes to downtown employees (e.g. Boulder's Eco-Pass).
   - Consider Intelligent Transportation System (ITS) technologies that enhance service reliability, real-time information, convenience and security. The WisDOT District 3 *Oshkosh/Fox Cities/Green Bay ITS Strategic Deployment Plan* identifies providing Automated Vehicle Location (AVL) for transit agencies to improve transit operations in fiscal year 2007.
   - Consider putting bike racks on all buses, which have been particularly popular and successful in cities with colleges.

6. **Parking:** The City should consider a comprehensive study of parking management and public transit services for the City. Current parking policies and decisions, both private and public, greatly impact the viability of public transit.

   Land use issues aside, high single occupancy vehicle (SOV) rates result from a combination of auto-accommodating parking policies and inadequate transit service. In fact, changes in factors related to parking price have a stronger effect on mode shift than do factors related to transit service. [4]

   Free or subsidized parking is a significant cost saving for those who drive. However, the cost of providing parking facilities, particularly parking ramps, is quite expensive. When these costs are not paid by facility users, they are paid by consumers through higher priced products and services, or in the case of public parking facilities, through higher taxes. Because subsidized parking reduces the cost to drivers, there is less incentive to walk, bike or use transit.

   A parking management plan should consider both capital and operational costs with respect to cost/revenue implications of providing parking and transit services. The City's parking

[4] Federal Transit Administration, *Strategies to Attract Auto Users to Public Transit*, TCRP Report 40;. 1998.

authority should work with Green Bay Metro to promote transit use among commuters and maximize efficient use of both parking and transit investments.

The City may find that increasing parking supply in areas with high land costs is much less cost-effective than freeing up existing parking spaces by providing incentives to use transit and other transportation modes.

Paratransit

Federal law requires that Green Bay Metro provide paratransit services to persons who cannot utilize available fixed route (bus) services. Paratransit service has more routing and scheduling flexibility than fixed route service, providing a curb to curb demand response system with wheelchair accessible vehicles. Paratransit is meant to be complementary to the fixed route system in terms of service area, service times, and cost.

Green Bay Metro currently contracts with Medi-Vans to provide paratransit service. However, private organizations or companies also provide transportation services for the disabled. In the Green Bay area, two private transportation service providers for the disabled were identified. Other organizations may also provide transportation services as part of their activities.

Brown County Planning Commission has worked with Green Bay Metro in reviewing the paratransit service performance provided by Medi-vans. The *Six-Month Review of the Performance of Medi-Vans*, produced in August 1999 evaluated on-time performance, in vehicle time, courtesy of Medi-Vans employees, appearance of Medi-Vans employees, vehicle crashes, vehicle sufficiency, reports, provider accountability, computer adequacy, and general client satisfaction. The report concluded and recommended that Medi-Vans:

- Eliminate trips over one hour
- Work toward eliminating late pickups
- Provide sensitivity training to all drivers and caretakers
- Require call takers to give their names every time a client calls
- Require drivers to become more familiar with ADA and other policies and procedures
- Ensure wheel chairs are secured tighter than the two inch play allowable by ADA to reduce shifting
- Continue to work with clients, Metro Staff, area service agency representatives, and the BCPC Elderly and Disabled Transportation Subcommittee to ensure a high level of performance.

Recommended Policies

1. **Ensure Quality Paratransit Service:** Green Bay Metro should continue to evaluate the performance and service provided by the paratransit contractor and work with them to correct problems and improve services, including those identified in the *Six-Month Review of the Performance of Medi-Vans*.

2. **Explore Strategies for Improving Paratransit Service:** Green Bay Metro should continue to explore strategies for providing cost-effective transit service to persons with disabilities. The WisDOT District 3 *Oshkosh/Fox Cities/Green Bay ITS Strategic Deployment Plan* proposes providing Computer Aided Dispatch (CAD) and Automated Vehicle Location (AVL) technologies in fiscal year 2007. This project would greatly improve paratransit trip scheduling and their ability to accommodate same-day trip requests.

   While providing affordable transportation for persons with disabilities is desirable, paratransit service compared with regular fixed route service is much more expensive. Paratransit service accounts for about 20 percent of Greeen Bay Metro's operating expense while making up only around five percent of

its ridership. Given the per trip cost of current paratransit service, Green Bay Metro may also want to identify strategies for making fixed route buses more accessible and attractive to disabled riders (e.g. converting to low-floor buses).

Intercity Bus

Intercity bus travel (e.g. Greyhound bus line) provides an affordable travel alternative for those traveling outside the metro area. Intercity bus customers are generally less likely to own a vehicle and more likely to be transit dependent. Therefore, intercity bus stations should be accessible by Green Bay Local Transit, preferably by sharing the transit center.

Objective 9 – Intercity Bus

Help maintain viable intercity bus service.

Recommended Policies:

1. **Intercity Bus:** The City should consider the needs of intercity bus companies in transportation decision-making.

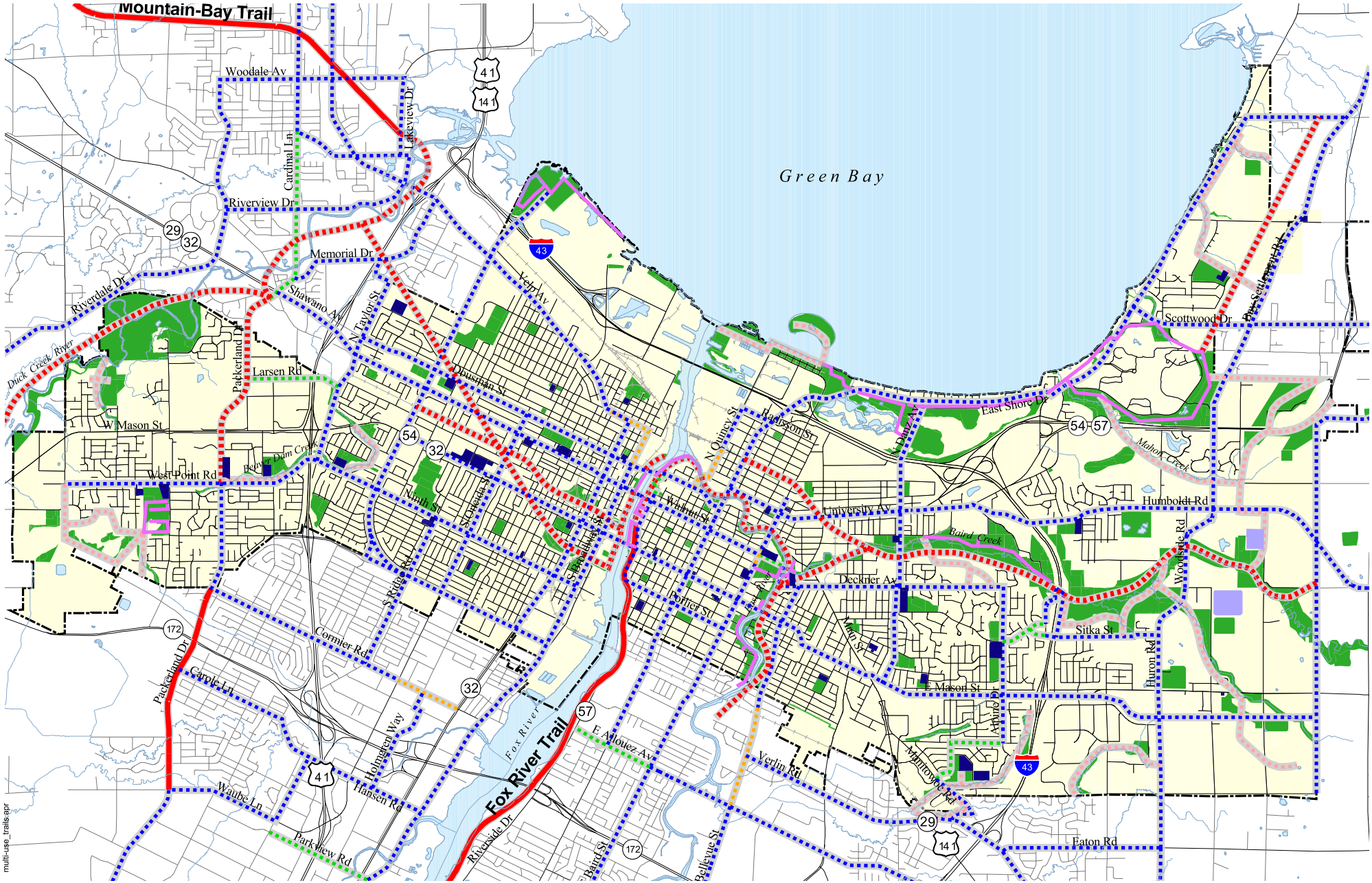
Multi-use trails in conjunction with on-road bike lanes can create a bicycle system that serves both recreational and utilitarian bike trips.

Bicycle System

Green Bay has a relatively low percentage of bicycle commuters even compared to similar Midwest cities. However, existing and planned trails such as the Fox River Trail will encourage biking for commuting and utilitarian trips as well as for recreational or exercise purposes. The bicycle network needs to function as a continuous and interconnected system by creating on-street connections to multi-use trails in order to serve both recreational and utilitarian bicycling.

The Wisconsin Department of Transportation has recognized the importance of bicycling as a legitimate transportation mode and clarifies their role for encouraging bicycling in the *Wisconsin Bicycle Transportation Plan 2020.* The plan presents a blueprint for improving bicycling conditions and encouraging bicycling in the state.

The Wisconsin Bicycle Transportation Plan calls the implementation of metropolitan area bicycle plans that have been prepared by Metropolitan Planning Organizations. The *Brown County Bicycle and Pedestrian Plan*, updated in June, 1998, provides recommendations for the Green Bay metropolitan area and provided the foundation for the following bicycle objective and policies. The following policies are consistent with the *Wisconsin Bicycle Transportation Plan 2020* and the *Brown County Bicycle and Pedestrian Plan*. The City should continue to work with WisDOT and Brown County through the implementation of these plans to increase bicycling and bicycling safety in Green Bay.



multi-use_trails.apr

Existing City Trails
Proposed City trails
Multi-Use Trail
Proposed Multi-Use Trails

Proposed Bike Lane
Proposed Bike Route
Proposed Wide Curb Lane

Schools
New Schools
Parks and Open Space

Figure 19-28

Proposed Multi Use Trails and Bicycle Facilities

0 2000 4000 8000 feet

NORTH

Objective 10 – Bicycle Network

Continue to build a connected bicycle route and trail network that is viable, convenient, and safe which will encourage utilitarian and recreational bicycling.

Recommended Policies:

1. **Bike Plan Implementation:** Work with Brown County Planning Commission to implement the *Brown County Bicycle and Pedestrian Plan* to develop an area wide bicycle network.

2. **New Multi-Use Trails:** Identify opportunities to create multi-use trails (see Figure 19-28). Abandoned rail lines should be obtained and maintained as contiguous corridors to be used as pedestrian/bicycle trails or for other future transportation purposes.

3. **On-Street Bicycle Lanes**. Bicycle routes and lanes should be striped and signed. On street bike-lanes should be included as part of major roadway reconstruction. There may be opportunities to provide on-street bicycle lanes by reconfiguring lane striping on existing roadways. Converting four-lane undivided roadways to three-lane roads as previously described could allow for the provision of bicycle lanes in some situations.

4. **Parkways:** Bicycle facilities should be provided on identified parkways where possible as shown in Figure 20-1 and 20-1. Some roadways such as Mason Street or Main Street may have right of way constraints or safety concerns that prevent them from adequately providing for bicycle facilities safely. Therefore, in some circumstances, parallel route alternatives will need to be identified to provide for bicycle travel.

Parking

Parking is both a land use issue and a transportation issue. An average parking space including driveways requires about 320 sq. ft of land. Large surface parking lots can be a barrier to pedestrians and discourage walking and transit trips. Also, the availability and price of parking has been shown to be a significant factor in commuting decision. Therefore, parking policy should not be thought of in isolation from transportation policy in general.

Downtown parking is generally seen as having the most contentious parking issues. While providing for parking is important for creating an accessible downtown, it is only one component of many. Clearly, parking should be available, but it should not be allowed to overwhelm what makes downtown unique and attractive.

Because downtown land prices are almost always higher than undeveloped land in the urban fringe, it is much more expensive to provide large amounts of inexpensive surface parking. Requiring new downtown development to meet minimum parking requirements, which are based on the demand for free parking for auto-oriented land uses, imposes a significant financial disincentive for developing downtown compared to urban fringe. For comparison purposes, Table 19-4 provides typical costs per parking space based on parking facility and location.

When it comes to providing large amounts of inexpensive parking, downtowns will never be able to compete with suburban develop, nor should they try. Instead, downtown needs to offer multi-modal options and create a comfortable, safe and attractive environment for pedestrians.

Table 19-4: Comparison of Typical Costs Per Parking Space

Location & Type	Land Costs	Land Costs	Construction Costs	O & M Costs	Total Annualized Cost
	Per Acre	*Per Space*	*Per Space*	*Annual, Per Space*	*Annual, Per Space*
Suburban, Surface, Free Land	$0	$0	$1,500	$100	$242
Suburban, Surface	$50,000	$455	$1,500	$100	$284
Suburban, 2-Level Structure	$50,000	$227	$6,000	$200	$788
Urban, Surface	$250,000	$2,083	$2,000	$150	$535
Urban, 3-Level Structure	$250,000	$694	$8,000	$250	$1,071
Urban, Underground	$250,000	$0	$20,000	$350	$2,238
CBD, Surface	$1,000,000	$7,692	$2,500	$200	$1,162
CBD, 4-Level Structure	$1,000,000	$1,923	$10,000	$300	$1,425
CBD, Underground	$1,000,000	$0	$22,000	$400	$2,288

Objective 11 – Parking Management

Provide efficient and cost-effective parking, which focuses on customer and visitor convenience, yet contributes to creating, a pleasant, safe and comfortable pedestrian environment, and an economically vital and socially vibrant community.

Recommended Policies:

1. **Downtown Parking Management Plan:** Develop and implement a Downtown Parking Management Plan that includes:

   - Inventory and usage survey of all parking facilities, both private and public, identifying surface lots with the potential for future development
   - An assessment of the cost of providing parking (e.g. capital, operation, maintenance, enforcement, etc.) and revenues (e.g., fees and enforcement fines)
   - A determination of what share of those costs are and should be assessed to users
   - Analysis of the cost effectiveness of supplying more parking. It may be more cost effective to charge for employee parking and provide a cash benefit to employers that allow them the choice of paying for parking or pocketing all or some of the money and use an alternative mode of transportation. , taking transit, carpooling, walking or biking.
   - Strategies for minimizing parking demand (e.g. encouraging "cash-out" parking programs among downtown employers, transit and carpooling incentives, shared parking programs, etc.)
   - Parking strategies that efficiently allocate the most convenient and desired parking to customers (e.g. pricing, time restrictions).
   - An assessment of the viability for creating angled parking on some downtown streets. Angle parking has the advantage of providing more of the most convenient and visible parking, while also calming traffic and creating a more street level activity.

   Expanding the Parking Management Plan to include other major employment or commercial sites may be desirable, particularly in older areas where parking is limited (e.g., the hospitals, Olde Main area, etc.)

2. **Downtown Customers and Visitors:** The most desirable and convenient parking should be managed to encourage customer and visitor access. Consistently full parking spaces has the same effect as having no parking spaces. A parking lot is considered generally considered full at 90 to 95 percent occupancy. Parking management strategies should be used to maintain these occupancy rates by promoting higher turnover for the highest demand parking spaces. The least convenient parking lots/ramps should be targeted for long term and employee usage. Parking management strategies include:

- Time limits and pricing to ensure higher turnover for short-term parking.
- Limit lower level ramp parking (i.e. most convenient parking) to customers by prohibiting parking prior to retail hours.
- Increase on-street parking along low traffic streets (consider angle parking where right-of-way permits). While on-street parking, particularly angle parking has been shown to increase accident rates, the severity of crashes are lower due to the traffic calming effect on-street parking creates.
- Promote shared parking agreements for compatible uses (e.g. office parking with high demand during the weekdays and entertainment uses with high demand during evenings and weekends).

3. **Neighborhood Parking:** On-street parking in residential areas near employment and commercial sites should strike a balance between providing resident parking and providing overflow commercial and employee parking. Requiring off-street parking may result in less attractive and less pedestrian friendly neighborhoods. Encourage strategies that can take advantage of excess on-street parking space near commercial areas. Consider strategies for addressing residential area on-street parking that allow flexibility for neighborhood specific situations that may include:

   - "Resident-only" permit zones.
   - Metered on-street parking with residential exemptions with revenues used to benefit neighborhood.
   - Time limited on-street parking with residential exemptions.
   - "Resident-only" permit zones with other users allowed to purchase parking permits.

   Consistent parking policies throughout the community may not be possible because of differing levels of demand and particular issues related to any given neighborhood.

   Benefits of allowing or encouraging on-street parking include:

   - Traffic calming by narrowing through traffic lanes
   - Buffering between moving traffic and pedestrians.
   - Use of "empty" or unused street space
   - Generates revenue.

4. **Minimum Parking Requirements:** It is widely accepted within the professional literature that a requirement for "excessive" amounts of parking yields lower land-use densities and larger impervious surface areas. Off-street parking areas can quickly grow and eat up a tremendous amount of land if it is not looked at critically. Mitigation measures include:

   - Continue to exempt downtown from minimum parking requirements.
   - Increase flexibility with minimum parking requirements to reflect typical daily demand and allow innovate parking provisions.
   - Encourage mixed use developments that share parking.

Angle parking can increase parking supply, calm traffic and improve the pedestrian environment.

Passenger Rail

The Midwest Regional Rail System is an initiative that proposes a passenger rail service which would serve the Midwest region with Chicago serving as the hub. The Midwest Regional Rail System Plan calls for five new trips between Green Bay and Milwaukee with 17 trips between Milwaukee and Chicago. There would be ten trips between Milwaukee and Madison. Most of the lines would have speeds up to 110 mph. The Green Bay segment would operate below 110 mph.

The Governors' Blue Ribbon Task Force on Passenger Rail recommends that the state and federal investment should cover majority of costs of the Midwest Regional Rail System. Implementation of the Midwest Regional Rail System would take many years to complete even after funding was committed, and money does not appear to be forthcoming in the near future. However, the potential for passenger rail to the area should still be considered.

The location of passenger rail service into the community would be important to its convenience and success. Ideally, a passenger rail station should be centrally located in order to provide convenient access to both recreational and business travelers and, therefore, should be as close to downtown Green Bay as possible.

A future passenger rail station should be integrated with public transit. The station could be integrated into an activity center with the transit station that would providing a multi-modal transportation hub. The train station could also serve as a focal point for riverfront development.

The old depot (currently the Titletown Brewery), would provide a logical choice for the location of a passenger rail station. The depot could be expanded and would create a nice atmosphere with the bar and restaurant being an amenity to travelers. While this location would require several street crossings creating potential safety concerns and some traffic delays, the benefits of being within walking distance to downtown would likely be worth identifying strategies to address traffic concerns.

A location south of Walnut Street would avoid these street crossings and prevent subsequent traffic delays and safety concerns. An alternative appropriate location for the depot may be within in a redevelopment area either just north or south of Mason Street. The area to the south of Mason Street is currently a coal storage area identified in the land use plan for medium/high density housing. The area to the north is already cleared and designated for mixed land uses.

Objective 12 – Passenger Rail

Work with WisDOT, Amtrak, and other agencies to bring passenger rail service to Green Bay.

Recommended Policies:

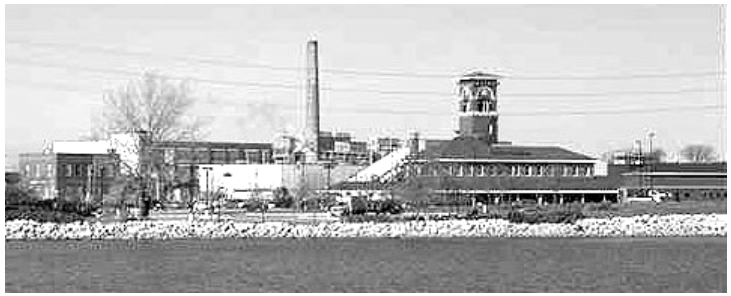
1. **Midwest Regional Rail Initiative:** Work with Midwest Regional Rail Initiative to promote passenger rail service in Green Bay.

2. **Maintain Passenger Rail Corridor and Identify Station Location:** Ensure that the rail corridor right-of-way that providing access between Green Bay and Milwaukee remains intact. Identify and plan location for a future passenger rail station that is:
   - Convenient to downtown
   - Can be integrated with Green Bay METRO
   - Serve as an activity center and riverfront development focal point.

Passenger rail station location to consider include:

- An expansion of the old depot, integrating it with it's current occupant, Title Town Brewery.
- Location directly south of Mason Street in a redevelopment effort in place of existing coal storage area.
- Location directly north of Mason Street within area already cleared and slated for mixed land use development.

3. **Passenger Rail Opportunities:** While regularly scheduled passenger service may not occur in the near future, there may be opportunities to promote special passenger rail services that could serve targeted tourism events such as Green Bay Packer games. Such a service would provide a unique experience for visitors and reduce the amount of congestion on freeways and local streets.



The old train depot, now Titletown Brewery, could be a potential site of passenger rail station if passenger rail returns to Green Bay as part of the Midwest Regional Rail System.

Freight Rail

Railroads provide a very efficient and cost-effective means of moving freight, which benefit both businesses and consumers. For example, according to the *Modal Shift Report for the Port of Green Bay*, it would take 3.8 trucks to carry the same amount of cement as one railcar. Unlike trucking companies that use public roadways, railroads operate and maintain their own right-of-way and infrastructure network. Freight that is hauled by rail not only means fewer trucks on public roadways but less wear on public highways and streets.

Over the last couple of decades, freight railroads have seen a resurgence in activity. This is due in part to partnerships with trucking firms and the development of intermodal facilities that allow for easier transfer of goods between railcars, truck, and ships.

There are three intermodal facilities in Green Bay, which allow for the transfer of goods between rail and truck (see Figure 19-29).

- The CN Rail Yard in Green Bay is equipped with lifts to load and unload containers from rail flat cars to truck trailers and vice versa.
- Leicht Transfer and Storage Company owns and operates a similar lift facility at 1401 State Street.
- Schneider National owns and operates a "piggyback" facility, whereby truck trailers are hauled on to railroad flat cars, which is located near Ashland Avenue south of Mason Street and north of 9th Street.

These facilities appear to be well utilized yet have the capacity to accommodate increased activity. Furthermore, these facilities, are located close to port facilities, which would prove beneficial should container shipments via the Great Lakes/St. Lawrence Seaway become more viable in the future. Leicht's facility has direct access to an existing dock.

The acquisition of Wisconsin Central Railroad by Canadian National (CN) resulted in CN being Green Bay's sole rail service provider. It is unclear what, if any, impact the change in ownership will have on rail service in Green Bay. Existing rail lines are shown on Figure 19-29.

Green Bay has good rail access into the older industrial areas. However, business changes in these areas have resulted in minimal utilization of existing rail spurs. Given the difficulty and expense of building new rail access to new industrial and manufacturing areas, maximizing the use of existing rail access should be promoted.

There is the potential for conflicts between rail and nearby land uses as well as safety concerns at railroad street crossings. Railroads traveling through or near residential neighborhoods can be disruptive to and create safety concerns. At grade railroad crossing can create safety and traffic problems.

Objective 13 – Freight Railroads

Work with private railroads to ensure safe crossings and mitigate impacts to neighborhoods and the downtown.

Recommended Policies:

1. **Industrial redevelopment:** The City should work to promote the redevelopment of existing industrial areas with industries that will use and benefit from existing rail facilities as identified in the Economic Development Plan.

2. **Intermodal Facilities:** The City should work with trucking, rail, and port interests to investigate opportunities to enhance intermodal freight transportation.

3. **Land Use Conflicts:** Changes in rail activity and/or adjacent land uses should be assessed in order to determine and mitigate potential negative impacts to adjacent residential areas.

   The land use plan on page 18-9 identifies future park areas on some existing rail facilities. These rail lines and rail yards are currently surrounded by residential uses. Residential and freight rail activities are not compatible land uses. Rail and intermodal activities located in these locations should be moved to areas that a more compatible for freight activity, such as the industrially-zoned area north of Velp Avenue (see Figure 19-29).

4. **Railroad Crossing Safety:** Increases in rail activity and changes in traffic volumes should be monitored for at-grade railroad street crossings in order to evaluate and mitigate safety risks.

5. **Railroad and Roadway Traffic Conflicts:** The City should work with the railroad in consideration of a policy that would encourage rail traffic during off-peak roadway travel times. Such a policy would minimize roadway traffic delays and improve safety conditions.

The Wisconsin Central railroad was acquired by Canadian National (CN), which provides all railroad service to the Green Bay area.

Airport

A master plan update was completed for t Austin Straubel International Airport in 1999. Passenger enplanements at the airport are projected to grow to about 635,000 in 2017, about a 3.2 percent annual growth rate from the approximately 344,000 passenger enplanements in 1998. Air cargo is also anticipated to grow from about 698,000 pounds annually in 2017 from 589,000 pounds in 1998, a 1.65 percent annual growth rate.

Current highway access to the airport is good. The airport is conveniently located a short distance from US 41along STH 172, which is a four lane divided roadway.

Austin Straubel International Airport has taken many proactive steps to minimize conflicts between noise-incompatible land uses within noise impact areas, including establishing a zoning ordinance to minimize incompatible development within noise impact areas and purchasing most properties in the most severe noise impact areas.

Brown County has adopted the Airport Zoning Districts Ordinance that institutes height restrictions in a small area within the Green Bay City boundary to address safety issues. The zoning ordinance also designates a noise impact zone, which requires building inspectors of the affected municipality to forward a completed copy of the "Building Noise Level Reduction Worksheet" to the Airport Director. The noise exposure forecasts suggest that current airport policies adequately address future airport noise and land use conflicts.

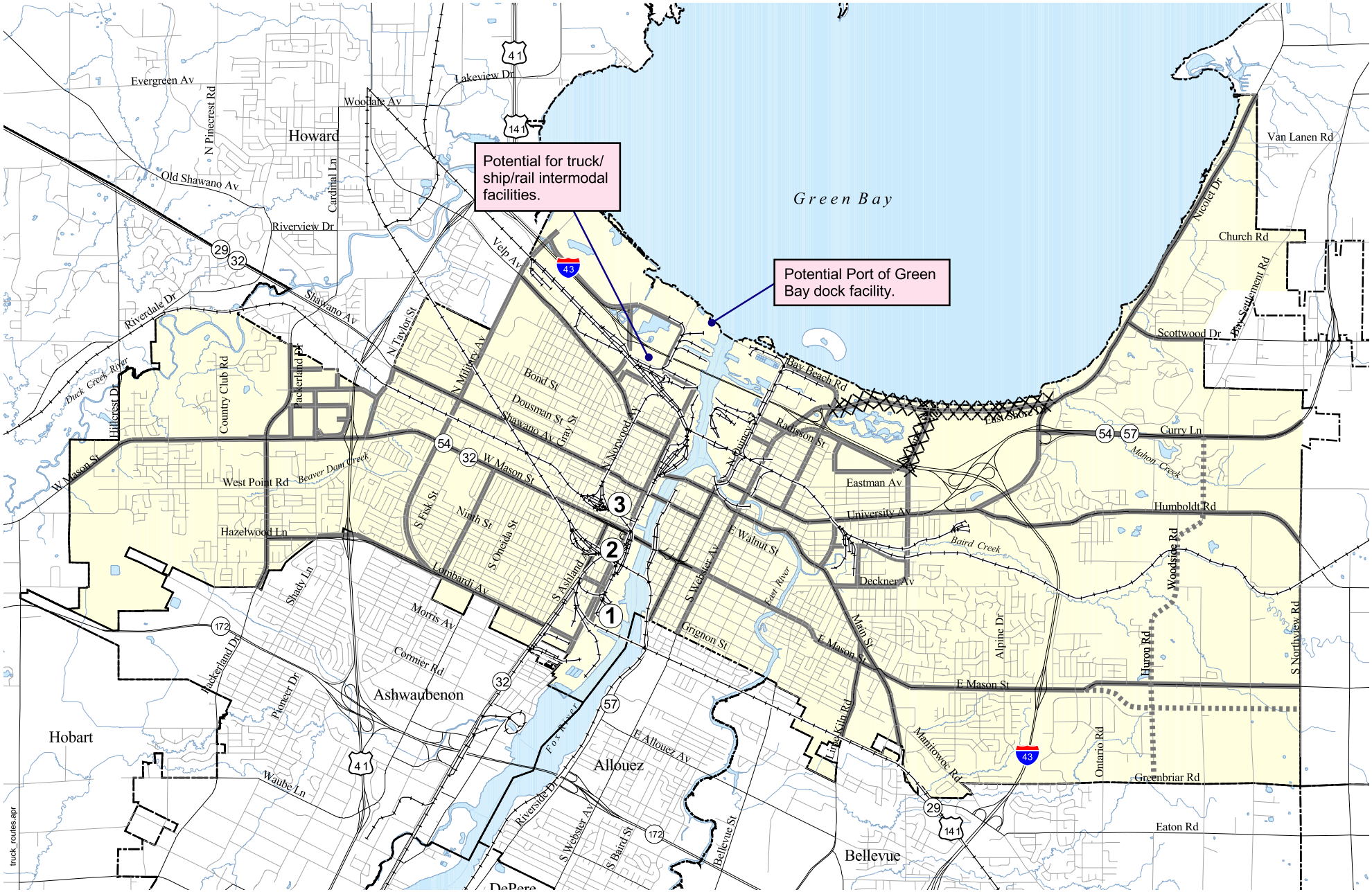
Objective 14 – Airport

Coordinate with Brown County and the administrators of Austin Straubel International Airport in their effort to maintain and improve passenger and freight services while minimizing impacts to surrounding neighborhoods.

Recommended Policies:

1. **Coordinate with Airport**. The City should work with the Austin Straubel International Airport to coordinate relevant city and airport policies.

2. **Land Use:** The City should consider potential airport noise and safety zone issues as it relates to changes in land uses near the airport.



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Truck Routes

Eliminated Truck Routes

Proposed Truck Routes

RAIL/TRUCK INTERMODAL FACILITIES

1. Leicht Transfer and Storage Company lift facility
2. Schnieder National "piggy back" facility
3. CN rail yard lift facility

Figure 19-29

Freight Facilities and Proposed Truck Routes

0 2000 4000 8000 feet

NORTH

Trucking

Truck freight movements are essential to the local and regional economy. Most finished consumer goods arrive by truck and therefore need to have access to commercial activity centers. Truck routes should direct truckers to their destinations on the most appropriate roads in order to minimize truck noise and safety impacts in residential areas and reduce wear on roads that are not suited to heavy vehicle traffic.

The trucking industry is an important component to the Green Bay area economy. About 110 trucking companies are located in Brown County averaging about 25 employees. Schneider National Inc., one of the largest transportation carriers in North America is headquartered in Ashwaubenon.

Schneider National operates a "piggyback" intermodal facility, whereby truck trailers or removable truck trailer bodies are hauled on railroad flat cars operated by the Canadian National Railroad. Leicht Transfer and Storage Company owns and operates a intermodal facility with a lift that can transfer freight containers easily between truck trailers and rail cars. The CN rail yard operates a similar lift facility.

Such intermodal facilities provide integrated transportation services that capitalize on the advantages of the various transportation modes. There may be additional opportunities to integrated port shipping with trucking and rail in the future.

Objective 15 – Trucking

Provide for the safe and efficient movement of truck traffic through Green Bay while minimizing negative impacts to neighborhoods.

Recommended Policies:

1. **Truck Routes:** Truck routes should direct trucks to destinations via the most appropriate roadways while discouraging travel through residential areas when possible. Proposed changes to the Green Bay truck routes are shown in Figure 19-29. Trucks cannot be prohibited from state aid roads. Therefore, the role of truck routes is to encourage the use of roadways that are appropriate for truck use.

2. **Roads to Industrial Sites:** Truck routes and roads used to access industrial areas need to be designed and built to adequately accommodate heavy truck traffic. Roadways through industrial areas targeted for redevelopment in the Economic Development Plan should be a higher priority to attract reinvestment to these sites (e.g. industrial area north of Velp Avenue).

3. **Intermodal Facilities:** The City should work with trucking, rail, and port interests to investigate opportunities to enhance and expand intermodal freight transportation.

Waterways

Water borne shipping is an exceptionally cost efficient means of moving goods, particularly heavy bulk goods such as coal, cement, limestone and salt. For example, the Modal Shift Report prepared for the Brown County Harbor Commission indicated that 6,369 rail cars or 31,845 trucks would have been required to move the coal delivered by 52 ships in 1999. Green Bay's port access to the Great Lakes/St. Lawrence Seaway Navigational System provides a valued resource that may offer the potential for greater utilization in the future.

The Fox River and the Bay of Green Bay are unique geographic features of the city and essential components to the economic vitality of the area. The Port of Green Bay does not operate any public port facilities but comprises 14 private terminal operators along the Fox River. Brown County operates the Port under the Brown County Port and Solid Waste Department, which developed a Strategic Plan for the Port of Green Bay in March 2000. A Port Master Plan is expected to be developed upon completion of the City's Comprehensive Plan.

The Port provides the Green Bay area with unique transportation advantages. The City should work with the Port to capitalize on these advantages and to maximize the use of existing port facilities where possible and explore opportunities to expand the use of the port.

The United States Army Corps of Engineers is currently conducting a study of the Great Lakes navigation system to review the feasibility of improving commercial navigation on the Great Lakes/St. Lawrence Seaway navigation system, including locks, dams, harbors, ports, channels, and other related features. The first phase of the review is a reconnaissance study, which will be completed in the summer of 2002.

The study will address factors affecting commercial navigation; identify factors and trends that affect commercial navigation; and project future trends and commodity flows. Initial results from the study indicate that both reliability and adequacy of the existing system present problems and opportunities. Suggested improvements include deepening Great Lakes connecting channels, the St. Lawrence Seaway and specific ports, and reconstruction of locks on the system. The report should provide insight into the role water transportation will play in Green Bay's future and shed more light on the potential for intermodal container shipping via the Great Lakes.

Objective 16 – Waterways and the Port of Green Bay

Work with Brown County and Port of Green Bay to maintain access to and the viability of the port.

Recommended Policies:

1. **Port Master Plan:** The City should work with the Brown County Port and Solid Waste Department in developing a Port of Green Bay Master Plan that is compatible and consistent with the City's Comprehensive Plan.

2. **Riverfront Property:** The City should support Brown County Port initiatives to relocate or reconfigure operations of companies located on the river that are no longer active users of dock facilities as identified in the land use and economic development plans.

3. **Concentrate Port Activity:** The City should support Brown County Port efforts to concentrate port activities when possible to the area north of Main Street on the west side of the Fox River and north of the East River on the east side of the Fox River. The City should work with the Brown County Port officials in assessing the viability of locating a new slip on bayfront property west of the Fox River (see Figure 19-29).

4. **Intermodal Connections:** The City should work with Brown County and WisDOT to ensure intermodal connections are maintained.

5. **Intermodal Facilities:** The City should work with trucking, rail, and port interests to investigate opportunities to enhance and expand intermodal freight transportation and investigate potential opportunities for water container shipments of finished goods (see Figure 19-29).

   Existing and proposed intermodal facility locations that handle containers and finished goods are in close proximity to port facilities. This will be advantageous if container shipments via the Great Lakes/St. Lawrence Seaway become more viable in the future.

Concentrating port-related activities closer to the mouth of the Fox River could open up development opportunities of valuable riverfront property.

Implementation Program

This section describes the major actions involved in the implementation of the *Smart Growth 2022* Transportation Plan. The relative priority of recommendations are also identified and the responsible agency and any coordination required for implementation.

Table 19-5: Implementation Program for the Transportation Plan

Priority	Action	Lead and Coordinating Agencies
1	**Plan Adoption:** The City of Green Bay will formally adopt *Smart Growth 2022* as its guiding document for development and improvement of its transportation system.	Planning Department Public Works Department Brown County Planning Commission Wisconsin Department of Transportation (WisDOT)
1	**Land Use Plan:** Implement land use plan recommendations and coordinate land use and transportation decisions within zoning code to include: • Compact, mixed and contiguous land use patterns. • New neighborhoods designed with grid pattern, narrower streets with sidewalks and street trees. • Promote infill and reinvestment in underutilized areas. • Activity centers should provide for bicycle, pedestrian and transit access. • Establish and adopt TOD areas and corresponding TOD site plan guidelines.	Planning Department Public Works Department Brown County Planning Commission
1	**Access Management:** Develop and implement access management plans for principal and minor arterial corridors. Access management strategies should be integrated with the parkway concepts identified in the urban design plan.	Planning Department Brown County Planning Commission Public Works Department WisDOT

Priority	Action	Lead and Coordinating Agencies
1	**Four-Lane to Three-Lane roads:** The City should consider converting four-lane undivided roadways to three-lane configurations with one through lane in each direction and a two-way left turning lane or dedicated left turn lanes at intersections (planted medians for long-term improvements). Appropriate roads to consider for 3-lane configurations include: • Shawano Avenue between Ashland Avenue and Military Avenue. • Baird Street between Mason Street and University Avenue: • Walnut Street between Monroe Street and Baird Street. • Ashland Avenue between Mather Street Mason Street. • Main Street through the "old Main" district.	Public Works Department Planning Department Brown County Planning Commission WisDOT
1	**Convert one-way pair to two-way streets:** Convert Jefferson Street / Madison Street one-way pair to two-way streets.	Public Works Department Planning Department Brown County Planning Commission WisDOT
1	**Parkways:** Adopt and develop parkway system and designs as described in the urban design plan.	Planning Department Public Works Department Brown County Planning Commission WisDOT
1	**Local Street Design:** New local streets should provide for traffic movement while ensuring a safe, attractive, and pedestrian and bicycle friendly neighborhood environments. Recommended local street design is 30-foot width from back of curb to back of curb and allows for two side parking and two way traffic, with six-foot planting strips, street trees and sidewalks on both sides of the road.	Public Works Department Planning Department

Priority	Action	Lead and Coordinating Agencies
1	**Sidewalks:** Require sidewalks or other pedestrian corridors in all new developments. Require pedestrian connections to greenway trails and other significant open space. Sidewalk connections and crosswalks at major intersections should be completed in coordination with new development. Sidewalks should have a minimum width of five-feet in residential areas and wider (e.g. six to 12-feet) in commercial areas.	Planning Department Public Works Department Brown County Planning Commission WisDOT
1	**Sidewalk System Plan:** Develop a plan that identifies and prioritizes sidewalk and pedestrian needs (e.g. pedestrian ramps, crosswalks, etc.). The plan should include an implementation process and program for funding pedestrian improvements in existing neighborhoods and developments. Improvements should be prioritized according to pedestrian benefits, safety, access to schools, parks and other major pedestrian generators.	Planning Department Brown County Planning Commission Public Works Department WisDOT
1	**METRO Transit Route Restructuring Assessment and Long-Range Service Plan:** Conduct a detailed transit route assessment to analyze existing and future route designs and develop a long-range transit service plan to coordinate the provision of future transit services with *Smart Growth 2022* recommendations.	Green Bay Metro Brown County Planning Commission Planning Department
1	**Bike Plan Implementation.** Implement the *Brown County Bicycle and Pedestrian Plan* and *Smart Growth 2022* bicycle system recommendations.	Public Works Department Planning Department Brown County Planning Commission WisDOT

Priority	Action	Lead and Coordinating Agencies
1	**Downtown Parking Management Plan:** Develop and implement a downtown parking management plan.	Planning Department Brown County Planning Commission Public Works Department
1	**Minimum Parking Requirements**. Exempt downtown from minimum parking requirements. Increase flexibility with minimum parking requirements to reflect typical daily demand and allow innovate parking provisions. Encourage mixed use developments that share parking.	Planning Department Brown County Planning Commission Public Works Department
1	**Traffic Calming:** Utilize appropriate traffic calming strategies on local streets and other streets where deemed appropriate and institute a citizen initiated traffic calming program.	Public Works Department Planning Department Brown County Planning Commission
1	**Walkway Maintenance and Snow Removal:** Pedestrian walkways need to be maintained for year round use. The City should develop and enforce sidewalk snow removal and maintenance ordinances and budget for the maintenance and snow removal of sidewalks under their jurisdiction.	Planning Department Public Works Department WisDOT
2	**Riverfront property:** Support Brown County Port initiatives to relocate or reconfigure operations of companies located on the river that are no longer active users of dock facilities as identified in the land use and economic development plans.	Planning Department Brown County Port and Solid Waste Department Economic Development Department
2	**Industrial redevelopment.** Work to promote the redevelopment of existing industrial areas with industries that will use and benefit from existing rail facilities as identified in the Economic Development Plan.	Economic Development Department Planning Department

Priority	Action	Lead and Coordinating Agencies
3	**Maintain Passenger Rail Corridor and Identify Station Location:** Ensure that the rail corridor right-of-way that provides access between Green Bay and Milwaukee remains intact. Identify and plan location for a future passenger rail station.	Planning Department Brown County Planning Commission WisDOT
3	**Intermodal Facilities:** Work with trucking, rail, and port interests to investigate opportunities to enhance intermodal freight transportation.	Economic Development Department Planning Department WisDOT Brown County Planning Commission
3	**Concentrate Port Activity:** Support Brown County Port efforts to concentrate port activities when possible to the area north of Main Street on the west side of the Fox River and north of the East River on the east side of the Fox River. The City should work with the Brown County Port officials in assessing the viability of locating a new slip on bay-front property west of the Fox River.	Economic Development Department Brown County Port and Solid Waste Department Brown County Planning Commission Planning Department WisDOT

Appendix A: Travel Demand Model and Forecasts

Travel Demand Modeling

Travel demand models are used to predict future traffic volumes and congestion and can be very useful tools in transportation planning for identifying potential traffic impacts.

Travel demand models generally use a four-step process which determines: trip generation, trip distribution, mode choice, and traffic assignment in an effort to recreate existing traffic conditions in a computerized environment. The number of trips are estimated using population, dwelling unit and types of employment data within small geographic areas. Where these trips go to, or are distributed, is based on trip types (e.g. home to work, home to shopping, etc) which are assigned to employment sites based on distance and time between trip origin and destination. Person trips are then converted to vehicle trips or transit trips. Lastly, trips are assigned to the computerized road network based on the best route option and trips are redirected to the next best option if congestion is projected to slow traffic on a particular route. Once the model can reasonably recreate existing traffic conditions, it is considered "validated." It is assumed that if the model can recreate existing conditions, it will be a reliable tool to determine future traffic conditions , based on future population, employment, and land use.

While travel demand models can be useful tools, they are only as good as the data available and the reasonableness of the assumptions used. The current Green Bay area travel demand model used in the following analysis was created and calibrated in 1995. Because the 2000 Census data by Transportation Analysis Zone (TAZ) was not available at the time of this study, alternative data sources were used to generate current socioeconomic data. Once the Census data becomes available, the Green Bay area model will need to be updated and validated with corresponding traffic count data.

Future year traffic forecasts are based on assumptions about "when", "where" and "if" future employment and population growth will occur. However, transportation improvements also influence the "when", "where" and "if" of future growth. Once a roadway is widened or capacity improved, past experience has shown that changes in land uses are also likely to result. This cyclical pattern of road development and land use changes over time is illustrated in Figure 19-1 . Changes in land use that result from transportation improvements generally have not been considered in travel demand models.

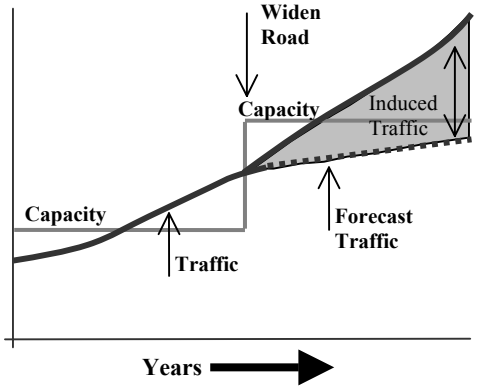
Induced traffic

Induced traffic is the additional travel resulting from a transportation improvement, which would not have otherwise occurred (see Figures 19-5 and 19-A1). As the result of the travel time savings associated with an improved roadway some people will:

- Change their route,
- Change their trip times,
- Change the number of trips they take,
- Change their mode of travel (e.g. public transit to driving), or
- Change their place of residence or workplace location.

Of these types of induced trips, the travel demand model only considered changes in trip routes, which explains, in part, why travel forecasts have generally underestimated the traffic impacts of major roadway improvements.

Figure 19-A1: Induced Traffic



Daily Travel Patterns: Traffic characteristics change throughout the day. Generally, the AM peak traffic period sees a very sharp increase in traffic that subsides relatively quickly. The afternoon peak period, in contrast, tends to be more spread out. However, as congestion creates delays during the peak period, travelers will begin to change their routes (assuming a more advantageous one is available) or they will begin to change their travel times to avoid delays during peak traffic times. Therefore, as congestion during peak times increases, trips begin to spread throughout more of the day, which from a system efficiency perspective is actually beneficial since more excess capacity is used during the off-peak periods.

Behavior changes explain why a travel model may indicate a level of service of "F" on a roadway, which is defined as gridlock, but in reality, traffic may be moving at relatively reasonable pace. Therefore, it is important to assess daily traffic patterns, since increasing capacity solely to accommodate a peak period traffic congestion, may not be an efficient use of resources where substantial excess capacity throughout most of the day.

2022 Traffic Forecast

Socioeconomic data, developed from the land use plan, was entered into the travel demand model to generate traffic forecasts for the year 2022. Figure 19-A2 illustrates the forecasted level of service for roadways from the travel demand model. The model assumes that the land use plan is fully realized by 2022 and surrounding communities will grow as projected by the Brown County Planning Commission. Most major metropolitan areas consider LOS D/E as an acceptable traffic condition.

The forecasted level of service depicted in Figure 19-A2 should be viewed with some skepticism. As described in Appendix A, the model has many limitations. While the model reflects the demographic and employment forecasts outlined in the land use plan, the model assumes that trip lengths and mode choice percentages remain constant. However, changes in land use, design, and transportation policies outlined in this plan, will lead to shorter travel distances, greater travel choices, which result in a decline in average vehicle miles of travel. If Green Bay follows the recommendations identified in the comprehensive plan, traffic should not increase to the degree shown in Figure 19-A2.

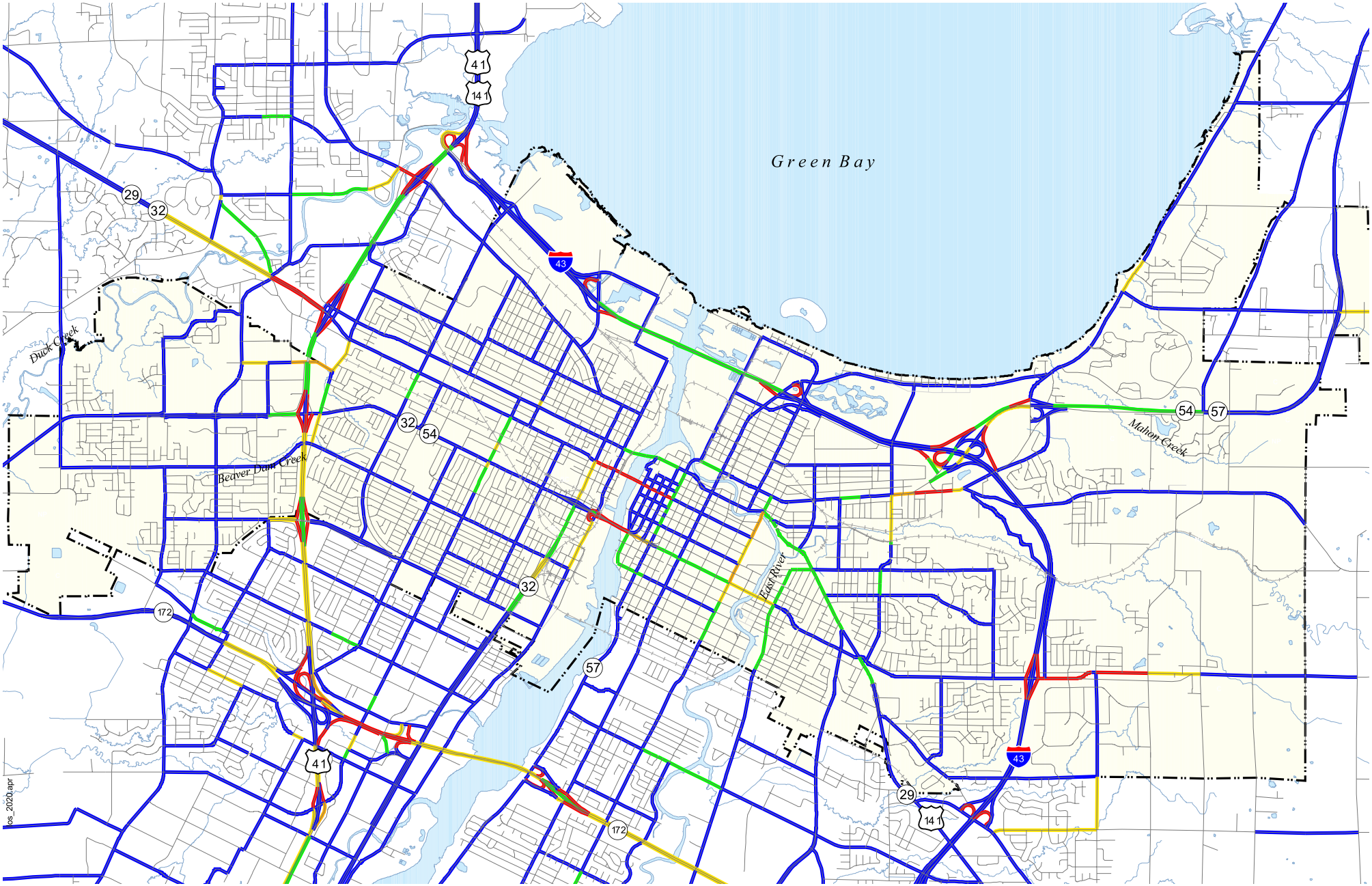
Isolated segments that show LOS problems may indicate that there is a problem with how the model is loading trips or in the case of interstate ramps, how capacities were determined. They may not necessarily indicate a future capacity problem. Furthermore, the model only includes major roadways and does not account for how the use of local roads may alter traffic demand.

US 41: US 41 between STH 172 and the Shawano Street and Dousman Street exits indicate LOS C and D. However, the travel demand model calculated by WisDOT in 2000 forecasted a lower LOS for this corridor. The discrepancies in travel demand model findings are likely result of differences in population and employment growth assumptions. As previously noted, the travel demand model should be updated and calibrated once the 2000

Census Transportation Planning Package (CTPP) data becomes available.

The long-range strategy proposed by WisDOT is to add capacity to this section of freeway by adding an additional lane in each direction. This strategy will likely improve the level of service, at least in the short term. However, traffic volumes are also likely to increase beyond what is currently forecasted for the corridor without the capacity improvements. These traffic increases may create capacity problems on connecting roadways.

While travel demand models are useful, they do not prescribe answers to potential congestion problems. The City may decide that attempting to solve the congestion problem may create a situation that is even less desirable than the congestion itself.



2022 LOS

- LOS B
- LOS C
- LOS D
- LOS E
- LOS F
- Local road
- Railroad

Based on Green Bay Landuse Plan

Figure 19-A2

2022 Traffic Level of Service Forcasts

0 2000 4000 8000 feet

NORTH